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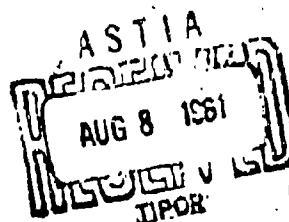


XEROX

Summary Report
of Project No. 209

on

THE DURABILITY AND MUD MOBILITY PERFORMANCE
OF 16-20, 8 P.R., NDCC TUBELESS TIRES



to

U.S. Army Ordnance Tank-Automotive Command
Detroit Arsenal
Centerline, Michigan

818-600

SOUTHWEST RESEARCH INSTITUTE
SAN ANTONIO, TEXAS

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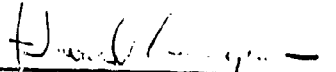
Southwest Research Institute
Road Evaluation Section
San Antonio, Texas

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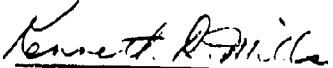
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TABLE OF CONTENTS

	<u>Page</u>
A. INTRODUCTION	1
B. ABSTRACT OF RESULTS	1
Phase 4 - Durability	
Phase 5 - Mud Mobility	
C. DISCUSSION OF RESULTS	2
Phase 4 - Durability	
Graph of Relative Durability	4
Photograph of Typically Worn Tire Treads	5
Phase 5 - Mud Mobility	6
D. PHASE 4, TIRE DURABILITY ON GRAVEL, PAVEMENT AND CROSS-COUNTRY	
1. Preparation of Vehicles for Test	6
2. Operation of Vehicles on Test Course	8
Diagram of Test Course	10
Photographs of Test Course	11
3. Scheduled Tire Rotation and Measurement	15
4. Data from Phase 4	20
E. PHASE 5, MUD MOBILITY	
1. Preparation of Vehicles and Equipment	57
2. Operating Procedure	58
3. Data from Phase 5	61

ADDENDUM TO PROJECT 209

As a result of information obtained from this test, (Project 209), it was found that there was an excessive amount of impact breaks occurring in the tire carcass construction, indicating the need of greater strength in this area of the tire. To correct this condition, Project No. 217 has been initiated for increasing the tire construction from 8 plies to 10 plies. This project is now in process of being run and will include the Sand Test Operations.

CRMC-REM.2 *E. D. Rogers*
Project Eng., E. D. ROGERS

A Introduction

The objectives of this program, conducted by Southwest Research Institute, were to evaluate a new 16-20, 8 ply rating N. D. C. C. tubeless tire intended for use on the Medium Vehicle Family and to compare the durability, mobility, etc. of these tires with standard 11.00-20, 12 P. R., N. D. C. C. tube type control tires. The program was divided into five phases:

- Phase 1 Sand Mobility
- Phase 2 Vehicle Performance and Air Loss
- Phase 3 Vehicle Performance and Tire
 Durability at Zero Inflation
- Phase 4 Tire Durability on Gravel, Pavement
 and Cross-Country
- Phase 5 Mud Mobility

Phase 4 was conducted first, followed by Phase 5. Because of the unsatisfactory carcass strength of the 16-20 tires noted during the Phase 4 operation, and because of adverse weather conditions which prevented operation in an 18-inch depth of dry sand, the first three phases were later deleted, with the expectation that more plys would be required in these tires. This Summary Report includes all pertinent information previously submitted in Progress Reports. Following the Abstract of Results, presented in Section B below, an unabridged discussion of the results of each phase is presented in Section C. Sections D and E present chronologically the test procedures and data.

B. Abstract of Results

Phase 4 - Durability on Gravel, Pavement and Cross-Country

The 16-20 tires had good wearing and riding characteristics, caused no difficulty in vehicle handling (except the steering required more effort) and were lighter in weight than the 11.00-20 tire and wheel assemblies. They did not, however, resist penetration failures satisfactorily and had the further disadvantage of being impossible to dismount for repair or replacement from the one-piece drop center safety rims, with hand tools, after the tires had accumulated some mileage.

Phase 5 - Mud Mobility

On a slick, 1 to 2 inch depth of mud overlaying a hardpan surface, the vehicle with 11.00-20 tires appeared to have a slight advantage in

being able to exert a greater drawbar pull than the vehicle equipped with the 16-20 tires. Reducing the tire pressures did not appreciably affect drawbar capabilities under these conditions. In a 12 inch depth of very soft mud, the 16-20 tires, inflated to 12 psi, had a definite advantage over the 11.00-20 tires inflated to the same pressure.

C. Discussion of Results

Phase 4 - Durability on Gravel, Pavement and Cross-Country

Two M135, 2-1/2 ton 6 x 6 trucks were operated together during this phase, one of which was equipped with the new 16-20 tires and the other with conventional 11.00-20 tires. During the first 8902 miles, with the 16-20 tires inflated to 36 psi (cold), all four of the bogie tires failed from rock cuts or breaks at mileages ranging from 1186 to 2671 miles. In addition, one front tire failed from the same cause after 7466 miles.

On May 6, 1960, new 16-20 tires were mounted on the bogies of one truck and the test was resumed with all of the tires on this truck inflated to 30 psi (cold). During the subsequent 9250 miles of operation, three more bogie tires failed from rock cuts at mileages ranging from 186 to 8344 miles.

During this period, the only original front tire in service developed a leak in one of the many deep cuts in the tread and was removed from test after a total of 10,575 miles.

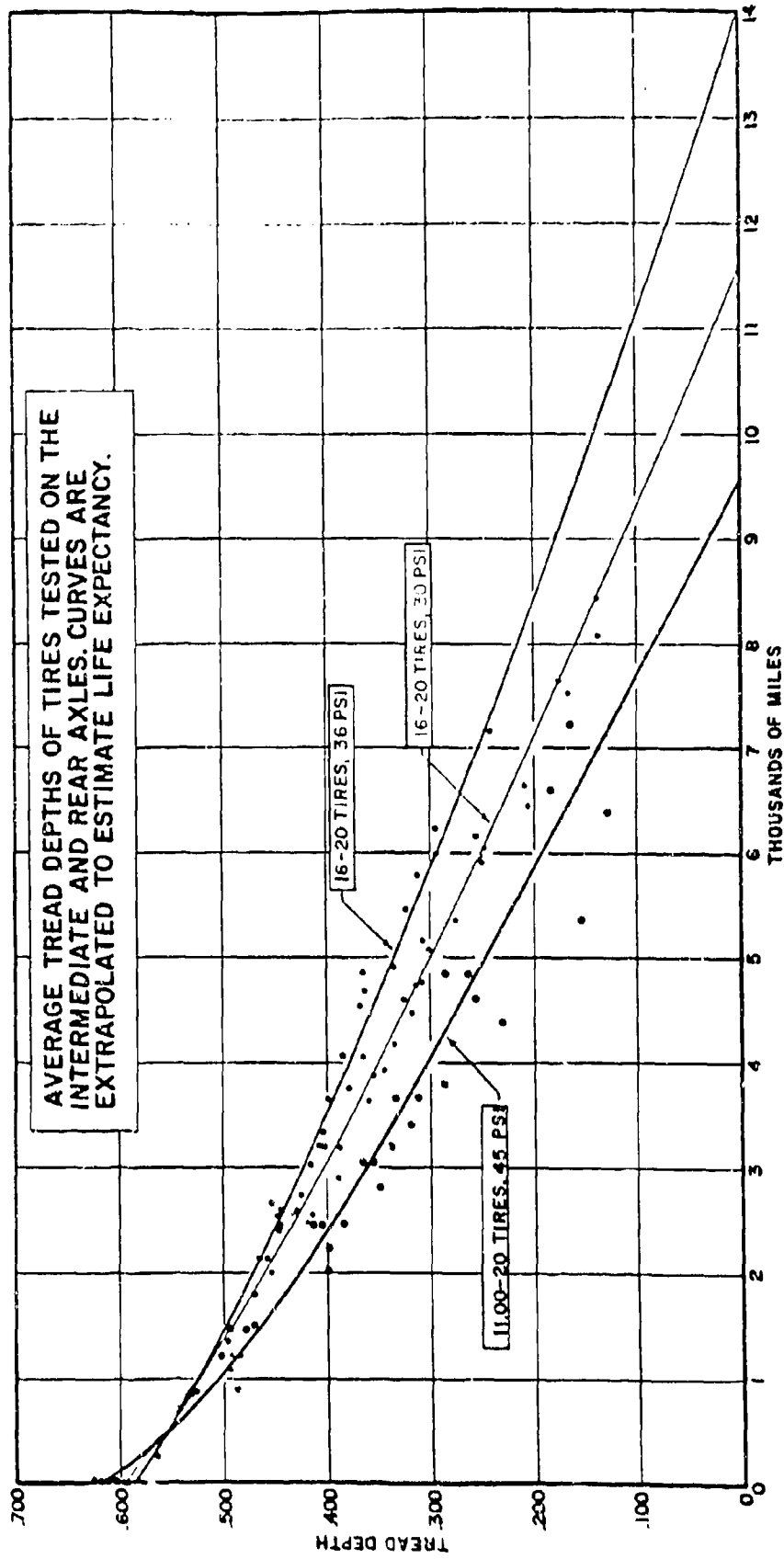
The 11.00-20 tires were inflated to 45 psi (cold) during the entire test. One of these failed from an unknown cause (possibly a puncture) and was damaged from having been run flat on the cross-country course. A second failed from a rock cut in the side wall near the shoulder. Six other 11.00-20 control tires were worn out (but still held air) at mileages ranging from 5317 to 8384 miles for bogie tires, and from 12,086 to 12,628 miles for front tires. Test of the 11.00-20 tires was terminated May 23, 1960, after a total of 12,927.9 miles, because the supply of control tires of this size scheduled for durability test was exhausted. Test of the 16-20 tires was terminated on June 13, 1960, after a total of 18,152 vehicle miles because of excessive mechanical maintenance requirements.

Two of the nine penetration failures of the 16-20 tires were of the "X break" type frequently experienced on rocky terrain. The other seven had the appearance of straight cuts through the tread rubber and cords. In addition, the 16-20 tires did not resist cutting of the tread

rubber (to the cords) very well and the larger cuts tended to grow as the test progressed. In at least one case, noted earlier, a cut split open and enlarged to the point of causing the tire to leak. No trouble was experienced with tread separations or air loss between the bead and the rim. The safety rims held the beads so tightly that it was impossible to dismount the tires with hand tools after they had been run. Dismounting was accomplished with a Branick Model TTR portable pneumatic press type bead breaker. The original mounting of these tires on one piece drop center rims was easily accomplished with hand tools.

The 16-20 tires gave a softer ride, which is important from the standpoint that reduction of shock loadings could possibly reduce vehicle maintenance requirements and could offer some advantage in transporting electronic equipment or wounded personnel. Steering, particularly at low speeds, requires more effort than with 11.00-20 tires but this could be overcome with power steering. Wearing characteristics were good, as shown graphically on Page 4. The 16-20 tire and wheel assembly weighs about the same as a standard military wheel with a 9.00-20 tire and tube, and is about 35 pounds lighter than an 11.00-20 assembly. This means that a 6 x 6 vehicle equipped with the 16-20's would be 210 pounds lighter than one equipped with single 11.00-20 and 740 pounds lighter than one equipped with dual 9.00-20's on the bogies.

The 11.00-20 tires had better resistance to penetration of the cords by sharp rocks and they steered more easily. The tread rubber, however, had inferior resistance to cutting and abrasion and wore out very rapidly. A photographic comparison of the abrasion of the 16-20 (No. 2 and No. 5) and 11.00-20 tires appears on Page 5. Tire 39, in this photograph, was a non-control tire, as explained on Page 18, run at the same time as the other 11.00-20's, and had excellent cut and abrasion resistance.



#2
6458 MI.

16-20

#32
6356 MI.

11.00-20

#5
6635 MI.

16-20

#38
5317 MI.

11.00-20

#31
5730 MI.

11.00-20

#39
6341 MI.

11.00-20 Non-control

Phase 5 - Mud Mobility

Two M35, 2-1/2 ton Reo 6 x 6 trucks were used during this phase, one of which was equipped with single 11.00-20 tires (in the M34 configuration) and the other with single 16-20 tires. Drawbar effort was measured with these vehicles operating on a slick 1 to 2 inch depth of mud overlaying a hardpan surface. Under these conditions, varying the tire inflation pressures did not affect the drawbar capabilities appreciably and in most tests, the 11.00-20 tires had a slight advantage, although the margin of difference was small.

In a 12 inch depth of mud, the most practical measurements for comparison of mobility characteristics seemed to be the time required to cover a measured distance or the distance traveled before the vehicle became stuck. In very soft mud which had a 12 inch depth, reducing tire inflation pressures improved mobility and under these conditions, the 16-20 tires gave enough floatation and tractive effort to carry the vehicle the entire length of the mud pit, whereas the truck with 11.00-20 tires became immobile before traveling half the length of the pit. Tread design probably does not exert much influence on mud mobility if the mud is at all sticky, as was the case here, because the treads fill 100% and the tires assume a toroidal appearance.

D. Phase 4 - Tire Durability, Gravel, Pavement and Cross-Country

1. Preparation of Vehicles for Test

Eighteen tubeless 16-20, 8 P.R., N. D. C. C. tires and twelve* 11.00-20, 12 P.R., N. D. C. C. conventional tube type tires were submitted for this initial phase. The 16-20 tires were mounted on special one piece drop center wheels manufactured by the Budd Company. In mounting these tires, Ruglyde was applied to the beads to facilitate seating of the tire bead against the rims with less than 40 psi inflation pressure. The 11.00-20 tires were mounted on standard two-piece military wheels.

The durability phase was conducted with three M135, 2-1/2 ton 6 x 6 trucks which had the following serial numbers:

USA 41149012
USA 41123434
USA 41144661

*Four of the 11.00-20 tires, however, were reserved for mobility tests.

Reference to the vehicles in this report will be by the last two digits of the serial numbers. These trucks had been rebuilt at Red River Arsenal and were delivered to the Institute on flat bed trucks.

In preparing the vehicles for test, the electrolyte was poured in the batteries, preservative material drained from the fuel tanks, cab and cargo body tarpaulins were erected and the lubricant level in all units was checked. The chassis were greased, and upon completing a mechanical check of valve lash timing, etc., the trucks were road tested. Clearance and turn signals were installed in compliance with state regulations. Tachographs were installed and calibrated.

The cargo bodies were divided longitudinally and laterally into six compartments with heavy wooden baffles and were ballasted with gravel. The baffles facilitated adjustment of the weight distribution and prevented the ballast from shifting while the vehicle was in operation. The gross vehicle weights were determined on a state certified scale and individual wheel weights were obtained on two scales which had platforms set flush with the floor. The weights were as tabulated below.

Truck No. :	12	34	61
Left Front	3330 lb.	3110 lb.	3270 lb.
Right Front	3220	3165	3300
Left Intermediate	3330	3570	3310
Right Intermediate	3350	3450	3220
Left Rear	3708	3800	3750
Right Rear	3750	3630	3800
GVW (State Certified)	20,700	20,715	20,620

The small variation between the sum of the wheel weights and the actual GVW was believed caused by hysteresis in the suspension system. This factor, together with some apparent variation in spring rates, caused considerable difficulty in trying to obtain 7500 pound loads on the rear and intermediate axles with only about a 6400 pound loading on the front axle.

The 11.00-20 tires were inflated to 45 psi, the 16-20 tires to 36 psi, and preliminary measurements of width and outside diameter of each tire were taken. Similar measurements were taken 24 hours later before the wheels were mounted on the vehicles. The width measurements were taken with a large caliper, and the diameter determined by measuring the circumference along the center rib with a Pi tape. Concurrently with the second measurements, the tread depths were measured

at ten premarked locations at approximately equal intervals about the periphery, on alternate sides of the center rib. The base of the Federal dial gage depth micrometer, which had one thousandth inch subdivisions, spanned between two lateral tread bars so measurements could be taken at the center of the radius that is tangent to both tread bars and the center rib. The crown radius was determined at three equally spaced points with metal templates, and the rubber hardness was measured with a Shore Durometer in three random locations on each tire. In addition, the tire and wheel assemblies were weighed (deflated) on a platform scale graduated in hundredths of a pound.

In mounting the wheels on the test vehicles, it was necessary to machine $1/4$ " off the outside diameter of the front brake drums to fit the special wheels used with the 16-20 tires. In addition, because of the greater width of these tires, they would not fit on the spare rack without modification, so the spare was carried in the bed of the truck. The 16-20 tire and wheel is about 35 pounds lighter than the 11.00-20 assembly. This difference in weight was offset by carrying a tow bar in the vehicle with the lighter tires.

2. Operation of Vehicles on Test Course

While the above work was in progress, the test course was laid out and distances were measured with a calibrated odometer. The total distance covered in an eight-hour shift was 148.4 miles, divided as follows:

Type Driving	Max. Speed mph	Distance Miles	Time Req'd Minutes	Percent of Total Miles
Cross-Country	10	22.30	222	15%
Gravel Road	30	22.24	38	15%
Highway	45	103.9	156	70%

Total driving time was 416 minutes, which left time during an eight-hour shift for fueling the vehicles, tightening lug nuts, checking tire pressures as well as contingencies such as changing a flat tire.

The cross-country and gravel courses were on the Camp Bullis Military Reservation on the northwest side of San Antonio. Highway mileage was accumulated between the Institute and Camp Bullis and between Camp Bullis and Comfort, Texas, as shown on the diagram on Page 10. Prior to starting the test, a 1500 yard section along Vera Cruz Road, connecting the cross-country trail with Monterey Road, required gravel surfacing. Six-hundred-twenty-five cubic yards of $1/4$ " to $1-1/4$ "

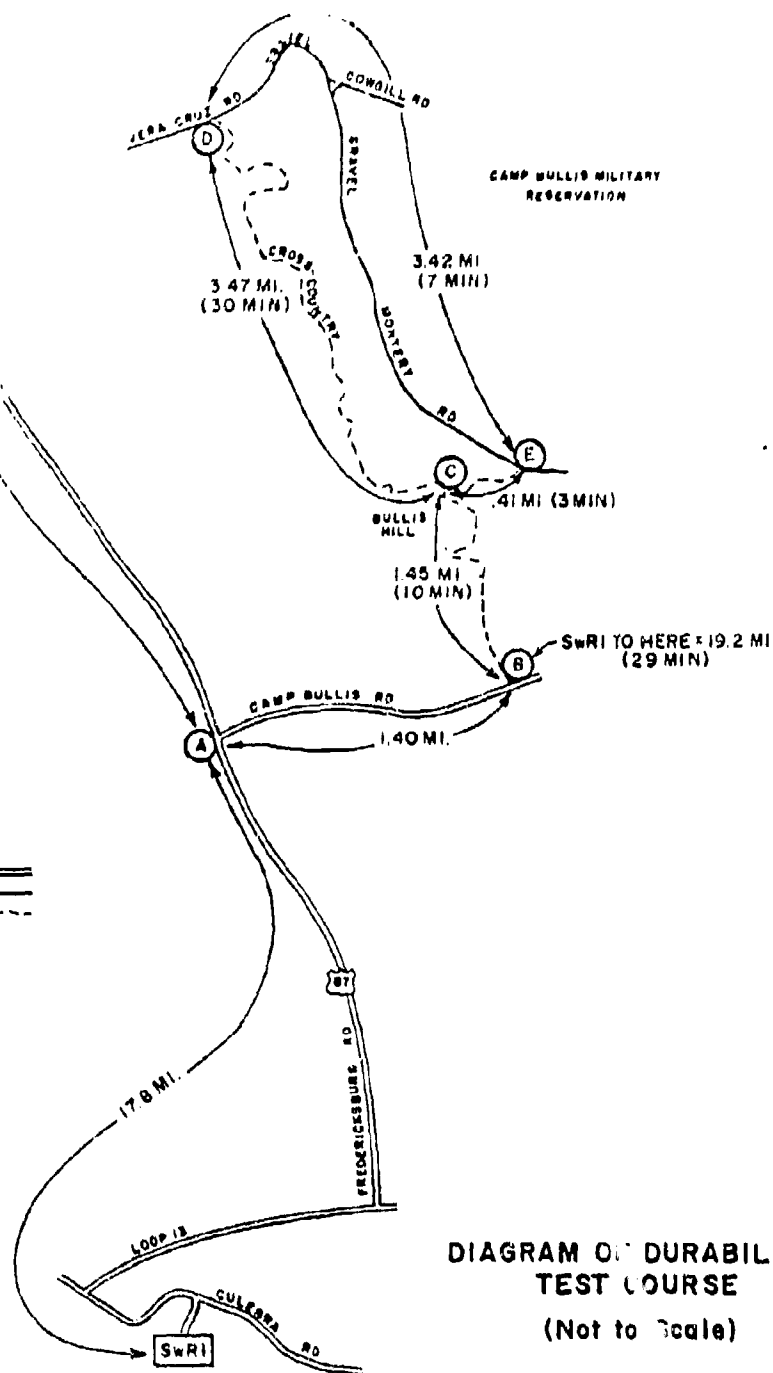
screen-size crushed limestone (railroad ballast) were spread to a depth of 2.5" to 3" on Vera Cruz Road. An additional 75 cubic yards of gravel were spread on Monterey Road in places where the original gravel had become dispersed or worn thin. As the test progressed, maintenance with a road grader and some additional gravel were required periodically.

Photographs of one of the M135 trucks with 16-20 tires, on Pages 11 through 14, show the nature of the trails and terrain on the cross-country course. In general, the area is hilly with many steep grades, and the trails are either entirely of rock or have only a thin overlay of gravel and dirt. Many areas present stair-step rock ledges which tend, particularly in wet weather, to cleave from time to time. This presents fresh abutments for the trucks to negotiate and more loose rocks are scattered on the trail. The loose rocks eventually become broken and pulverized and are replaced with more loose rocks. In this respect, the conditions remain unchanged over a period of many years.

The highway mileage was accumulated on black top surfaced roads. Part of these roads had a very fine textured seal-coat type surface, and part had a worn pea gravel and asphalt surface. Neither of these surfaces was unusually abrasive.

TO TURN AROUND
AT COMFORT, TEXAS

LEGEND
BLACK TOPPED HIGHWAY
GRAVEL ROAD
CROSS COUNTRY TRAIL





2-1/2 Ton, M135 Truck with 16-20 Test Tires on the
Camp Bullis, Texas Cross-Country Course



2-1/2 Ton, M135 Truck with 16-20 Test Tires on the
Camp Bullia, Texas Cross-Country Course



2-1 1/2 Ton, M135 Truck with 16-20 Test Tires on the
Camp Bullis, Texas Cross Country Course



2-1/2 Ton, M135 Truck with 16-20 Test Tires on the
Camp Bullis, Texas Cross Country Course

Actual operation of the vehicles on the test course was started at 2:30 p. m., March 24, 1960, with truck numbers 12 and 34. After truck 34 had run about 2-1/2 miles on the cross-country course, a rod bearing failed. The tires from this truck were installed on spare truck number 61 and the test resumed on March 25. Operation was on a two-shift per day basis, five days per week. During the morning shift, which started at 2:30 a. m., the vehicles were run 84.7 miles on the highway, and after the drivers had a thirty-minute breakfast, the cross-country and gravel course driving was started at dawn. After negotiating five laps in a clockwise direction on the Camp Bullis course (plus doubling back once on the gravel road from Intersection E to Cowgill Road), the drivers returned to the Institute at approximately 10:30 a. m. The evening shift started at 2:30 p. m. and the drivers completed five laps on the Camp Bullis course in a counter-clockwise direction at dusk. After a thirty-minute dinner, the trucks were driven on the highway for the rest of the shift. The interval between 10:30 a. m. and 2:30 p. m. was available for tire rotation and measurement, vehicle maintenance, etc. Daily rotation of the drivers between the vehicles canceled the influence of their individual driving characteristics.

The diagram on Page 10 shows point to point mileages and time intervals which were determined before the test was started. Actually, as the drivers became more proficient, they were able to complete the 7.3 mile cycle on the Camp Bullis course in about 33 to 35 minutes instead of 40 minutes.

3. Scheduled Tire Rotation and Measurement

Tires were rotated in a figure "8" about the rear bogies and from side to side on the front wheels every other day (every 594 miles). After completing a circuit on the rear bogies, the tires were scheduled for complete measurements, similar to those taken initially, and exchange of the tires between the two vehicles. When it became apparent that some tires would fail before reaching the second measurement period, tread depths were measured every other day at the same time the tires were rotated.

Tire deflection measurements were scheduled initially and during each major measurement period. Several approaches were taken in attempting to obtain valid deflection data, the last of which was as follows:

- (a) The vehicle was driven into the fleet laboratory slowly and allowed to coast to a stop after the ignition switch was turned off, without applying the brakes.

- (b) After the tires had cooled to approximately ambient temperatures, the pressures were checked and adjusted with a dead-weight tested Ashcroft bourdon-tube gage.
- (c) The lowest point on the edge of each wheel rim, directly below the center of the axle was marked with a center punch.
- (d) The perpendicular distances from the concrete floor to the punch marks were measured with a machinist's surface gage which had a vernier adjustment in the base and a steel scale graduated in 1/32" increments.
- (e) After completing these measurements on all six wheels, one wheel at a time was jacked up until rotation of the wheel produced only a trace of drag in its contact with the floor. Unloaded heights were then recorded as in step (d).
- (f) The unloaded height was then divided by the difference in the two measurements obtained at each wheel to give percent deflection. The average of the deflections of all four bogie wheels then gave the most valid value.

Hysteresis in the suspension system causes the individual wheels to carry different loads under a static condition, as was noted in ballasting these vehicles, and the percentage of tire deflection is proportional to the load. (Under dynamic conditions of actual operation, vibration and minor irregularities in the road surface probably cause the bogie suspension to split the load fairly evenly.) The following typical tabulations indicate the extent of the variations found in measuring deflections by the above procedure:

Tire Deflection Measurements

(Truck No. 61, 16-20 Tires, 36 psi Pressure, April 13, 1960)

<u>Wheel Position</u>	<u>Tire No.</u>	<u>Unloaded Height</u>	<u>Loaded Height</u>	<u>Percent Deflection</u>	<u>Average Fronts</u>	<u>Average Bogies</u>
L. F.	9	11.0625	9.3438	15.5	15.7%	
R. F.	15	11.0625	9.3125	15.8		
L. I.	13	10.9688	8.9063	18.8		17.2%
R. I.	12	11.6250	9.6875	16.7		
L. R.	16	10.9063	9.0625	16.9		
R. R.	8	11.1563	9.3125	16.5		

Tire Deflection Measurements (cont'd)

(Truck No. 12, 11.00-20 Tires, 45 psi Pressure, April 13, 1960)

<u>Wheel Position</u>	<u>Tire No.</u>	<u>Unloaded Height</u>	<u>Loaded Height</u>	<u>Percent Deflection</u>	<u>Average Fronts</u>	<u>Average Bogies</u>
L. F.	34	9.7188	8.2813	14.8	14%	
R. F.	36	9.6875	8.4063	13.2		
L. I.	31	9.5938	8.0313	16.3		
R. I.	33	9.8125	8.2813	15.6		16.1%
L. R.	35	9.8438	8.1563	17.1		
R. R.	32	9.6563	8.1875	15.2		

(Truck No. 34, 16-20 Tires, 30 psi Pressure, May 18, 1960)

L. F.	18	10.750	9.000	16.3	16.6%	
R. F.	10	10.9375	9.0938	16.9		
L. I.	2	10.969	8.719	20.5		
R. I.	11	11.125	9.1875	17.4		18.3%
L. R.	7	10.719	8.719	18.7		
R. R.	4	10.875	9.0625	16.7		

(Truck No. 12, 11.00-20 Tires, 45 psi Pressure, May 18, 1960)

L. F.	36	9.469	8.125	14.2	14.6%	
R. F.	34	9.406	8.000	14.9		
L. I.	*	9.875	8.250	16.5		
R. I.	*	9.719	8.313	14.5		15.2%
L. R.	A	9.8125	8.219	16.2		
R. R.	39	9.5625	8.281	13.4		

*All four bogie tires were non-control tires.

Because of the inherent inaccuracy, measurement of deflections was discontinued. It is recommended, in conducting tests with the M135 series vehicles, that a special fixture be constructed to measure deflections on individual wheels in a hydraulic press or else that the work be conducted on a scale to indicate individual wheel weights at the same time the deflection measurements are taken. By doing this, a wheel loading versus tire deflection curve could be developed and any deviation from the curve, as the test progressed, could be noted. The M34 and M35 series vehicles do not have overload springs and less difficulty was experienced in getting evenly divided bogie wheel weights when preparing these vehicles for mobility tests. The deflection measurement

procedure outlined on Page 15 would probably work satisfactorily with the 6 x 6 M34 or on four-wheeled vehicles.

Tire cord temperatures were measured with a hypodermic needle thermocouple connected to a potentiometer. Recordings were made immediately upon the arrival of the trucks at the Institute at 10:30 a.m., after the trucks had run 19.2 miles on the highway at 45 mph. It is believed that this represented the period of peak temperatures, since the bulk of the highway mileage was accumulated at night. Recorded values varied with ambient temperatures, solar radiation, whether the tires were relatively new or worn, inflation pressure, precipitation, etc. Comparison of the average temperature of the four bogie tires on any given day indicates that the 16-20 tires ran at an average of from 5° to 13° F cooler than the 11.00-20 tires. The operation was not conducive to high temperatures, and the maximum tire temperatures recorded during the test when the 16-20 tires were inflated to 36 psi (cold) were 125°F (at 72°F ambient) for the 16-20 tires and 140°F (at 75°F ambient) for the 11.00-20 tires.

On May 6, 1960, test of the 16-20 tires inflated to 36 psi (cold) was discontinued and a new set of similar tires were mounted on the bogies. These, and the front tires, were inflated to 30 psi cold. A valid comparison of temperature could not be made with the 11.00-20 tires on a day-to-day basis because the 11.00-20 tires still on test were nearly worn out. The 16-20 tire temperatures recorded during the first 2000 miles of the 30 psi test were generally in the 135-140°F range at about 70°F ambient. As the tires became worn, ambient temperatures increased to the 80-90°F range and the tires continued to run in the 135-140°F range.

Running inflation pressures were recorded daily at the completion of the cross-country operation and upon arrival at the Institute. Pressures in the 16-20 tires normally increased to approximately 40 psi in the 36 psi test and to 34 psi in the 30 psi test. Pressures in the 11.00-20 tires increased from 45 psi (cold) to approximately 52 psi.

As the test progressed, the supply of 11.00-20 tires scheduled for durability test was exhausted, so to keep the vehicle running to complete the test tires still in service, several "non-control" tires were used. These were manufactured in 1959 and were selected from the tires which were on the trucks when they were received from Red River Arsenal. Complete measurements were taken on one of these non-control tires, which was numbered 39, and tread depth measurements were taken on another, designated tire "A". The following differences between the test tires and these two non-control tires were noted:

- (a) Operating temperatures were from approximately 25-40°F higher than the control tires, and ran as high as 183°F.
- (b) Air pressure built up from 45 psi cold to 55 psi hot; the pressure build-up in the 11.00-20 control tires was about 7 psi.
- (c) Antioxidant caused light green discoloration; the control tires turned light red.
- (d) The non-control tires had a greater durometer hardness.
- (e) The non-control tires had very good resistance to cutting and abrasion.
- (f) Wearing characteristics of the non-control tires were comparable to the 16-20 test tires and were considerably better than the 11.00-20 control tires.

4. Data, Durability, Phase 4

Complete tire measurement data is presented on the following pages followed by a tabulation of unscheduled tire maintenance.

Assigned Tire No. 1Tire Size 16-20Initial Weight 130.25Inflation Pressure (cold) 33 p.s.i.Final Weight 178.50 on 5-17Loss 3.66

BOGIE TIRE

Odom Miles	Actual Miles	Date	TREAD		DEPTH		POSITION		8 In	9 Out	10 In	Avg Depth	HARDNESS (3 Random Points)	
			1 Out	2 In	3 Out	4 In	5 Out	6 In						7 Out
	0	4-7	.598	.600	.600	.600	.598	.598	.600	.600	.599	.600	.599	52 54 52
	241.8	4-18	.565	.561	.561	.565	.566	.565	.568	.566	.570	.562	.573	52 52 50
	809.4	4-28	.534	.526	.540	.524	.536	.530	.539	.532	.535	.530	.533	52 50 52
	1337.5	5-2	.499	.492	.500	.495	.500	.494	.502	.493	.495	.492	.496	
	2518.3	5-17	.458	.441	.452	.441	.450	.442	.455	.446	.450	.445	.448	53 53 54

REMARKS: - Note mileage, date and result of inspection for cuts, breaks, separation, wheel cracks etc.

4-18 - NO CUTS

4-28 - 1/2" 1/4" CUTS TO CORD

5-17 - 1/2", 1/2", 1/2", 1/2", 1/2", 1/2", 1/2" CUTS TO CORD (FINAL MEASUREMENTS AT 36 PSI)

TIRE REMOVED FROM TEST IN SATISFACTORY CONDITION ON 5-8 TO START A NEW SET OF BOGIE TIRES ON T

1

Wheel No. 17

- p. 5. 1.

гусков etc.

1)

10 TIMES ON TEST

2

Assigned Tire No. 2Tire Size 16 20Initial Weight 181.31 LbsInflation Pressure (cold) 30 p.s.i.Final Weight 166.14Loss 15.17

BOGIE TIRE

Odom Miles	Actual Miles	Date	TREAD DEPTH POSITION										Avg Depth	HARDEN (6 3 R Point)
			1 Cut	2 In	3 Out	4 In	5 Out	6 In	7 Out	8 In	9 Out	10 In		
	0	5-6	.600	.600	.599	.600	.599	.598	.598	.599	.598	.600	.599	53 54 5
	1193.4	5-11	.498	.500	.495	.495	.498	.490	.491	.494	.487	.483	.494	
	2527.1	5-17	.419	.420	.415	.413	.416	.408	.416	.418	.415	.418	.416	45 46 5
	3183.7	5-19	.400	.391	.395	.381	.395	.378	.395	.385	.372	.394	.389	
	3913.7	5-23	.347	.349	.350	.347	.359	.340	.347	.346	.341	.348	.347	
	4460.9	5-25	.332	.322	.330	.328	.334	.320	.326	.324	.329	.335	.320	
	4757.7	5-27	.309	.313	.317	.312	.320	.304	.310	.315	.305	.313	.312	48 46 5
	5075.1	6-2	.302	.307	.310	.299	.315	.295	.304	.302	.292	.316	.304	
	5958.1	6-7	.254	.264	.252	.252	.265	.247	.253	.245	.244	.255	.253	50 50 5
	6458.2	7-6	.205	.211	.209	.208	.223	.200	.208	.193	.198	.220	.207	52 52 5

REMARKS: - Note mileage, date and result of inspection for cuts, breaks, separation, wheel cracks

5-6 MEASUREMENTS JUST AFTER AIRING UP FOR FIRST TIME

5-17 - 1-1/2", 1/2", 1", 1-1/4", 1/2", 1/2", 1" CUTS TO CORD - FUZZY

5-27 - TWO BIG 3" CUTS - MANY SMALL CUTS AND TIRE HAS FUZZY APPEARANCE

6-7 - TWO BIG 4" CUTS - MULTIPLE SMALL CUTS - FUZZY

6-13 - TEST TERMINATED BECAUSE OF MECHANICAL FAILURE OF TRUCK - TIRE HOLDS AIR AND IS IN SATISFACTORY

7-6 - FINAL INSPECTION - 4", 4" CUTS TO CORD - MULTIPLE MINOR CUTS

1

Tire Serial No. CN 48253Wheel No. 70 p.s.i.

th	HARDNESS (6 3 Random Points)	CROWN RADIUS				WIDTH			O. D.	DEFLECTION		
		1	2	3	AVG	1	2	3		no load height	loaded height	% Def.
	53 54 53	10-7/8	11-1/8	11-1/8	11.04	15.00	15.00	15.00	43.21			
	45 46 50	11-1/8	11-1/8	11-1/8	11-1/8	15-9/32	15-9/32	15-9/32	43.90			
	48 46 50	11-1/8	11-1/8	11-1/8	11-1/8	15-10/32	15-10/32	15-10/32	43.63			
	50 50 50	11-3/8	11-3/8	11-3/8	11-3/8	15-11/32	15-11/32	15-11/32	43.58			
	52 52 52	11-3/8	11-3/8	11-3/8	11-3/8	15-12/32	15-12/32	15-12/32	43.41			

rel cracks etc.

IN SATISFACTORY CONDITION AFTER A TOTAL OF 6458.2 MILES.

2

Time 3130 10-20

Inflation Pressure (cold) 30 p

Loss _____

BOGIE TIRE

[illegible]

REMARKS: - Note mileage, date and result of inspection for cuts, breaks, separation, wheel cruc

FAILED FROM STONE CUT AFTER 185.6 MILES OF SERVICE ON 5-7-1960 - NO FURTHER MEASUREMENTS TAKEN

GN 31319

16

p. 1.

[illegible]

wheel crucks etc.

MENTS TAKEN

2

Assigned Tire No. 4Tire Size 16 20Initial Weight 181.10 LbsInflation Pressure (cold) 30 p.s.i.Final Weight 161.10Loss 20.00

BOGIE TIRE

Odom Miles	Actual Miles	Date	TREAD		DEPTH		POSITION		8	9	10	Avg Depth	HANDNESS (4 3 R/L Points)	
			1 Out	2 In	3 Out	4 In	5 Out	6 In						7 Out
	0	5-6	.600	.602	.600	.606	.602	.606	.605	.605	.603	.603	52 51 53	
	1193.4	5-11	.501	.505	.500	.506	.499	.507	.503	.502	.503	.503		
	2590.1	5-17	.435	.429	.427	.433	.426	.436	.438	.433	.434	.437	52 53 51	
	3183.7	5-19	.395	.402	.400	.407	.404	.403	.405	.410	.400	.402	.403	
	4048.7	5-23	.370	.367	.359	.368	.361	.372	.372	.367	.372	.370	.368	
	4595.9	5-25	.327	.320	.329	.318	.325	.329	.331	.334	.330	.325	.327	
	5160.2	5-27	.308	.305	.309	.312	.312	.308	.315	.312	.314	.304	.310	55 54 54
	6166.8	6-2	.255	.257	.252	.256	.253	.265	.264	.262	.252	.260	.258	
	7643.0	6-7	.160	.172	.186	.172	.169	.187	.184	.190	.173	.178	.177	53 53 53
	8419.6	7-6	.149	.144	.121	.137	.133	.154	.135	.147	.140	.136	.140	52 54 54

REMARKS: - Note mileage, date and result of inspection for cuts, breaks, separation, wheel cracks etc

5-17 - 1/2", 1/2", 1/2" CUTS TO CORD - VERY FUZZY - PARTICULARLY IN THE MIDDLE OF THE TREAD

5-27 - SERIES OF 1/2" TO 1" CUTS - ONE LARGE SPIN CUT AT SHOULDER - SHALLOW

6-7 - MULTIPLE CUTS WITH ONE LONG SPIN CUT AT SHOULDER

6-13 - TEST TERMINATED BECAUSE OF MECHANICAL FAILURE OF TRUCK - TIRE HOLDS AIR AND IS IN SATISFACTORY

7-6 - FINAL INSPECTION: ONE SPIN CUT, ONE 2" CUT TO CORD AND MULTIPLE SMALL CUTS 1/2" TO 1-1/2" L

1

Tire Serial No. GN 48210Wheel No. 25 p.s.i.

n	HARDNESS (@ 3 Random Points)	CROWN RADIUS				WIDTH			O. D.	DEFLECTION		
		1	2	3	Avg	1	2	3		no load height	loaded height	% Def.
	52 51 53	11-1/8	11-3/8	11-3/8	11.292	15-3/32	14-31/32	14-31/32	43.20			
	52 53 51	11-1/8	11-1/8	11-1/8	11-1/8	15-11/32	15-11/32	15-11/32	43.66			
	55 54 54	11-5/8	11-5/8	11-5/8	11-5/8	15-5/16	15-5/16	15-5/16	43.38			
	53 53 55	11-7/8	11-7/8	11-7/8	11-7/8	15-7/16	15-7/16	15-5/16	43.08			
	52 54 54	11-7/8	11-7/8	11-7/8	11-7/8	15-13/32	15-13/32	15-13/32	42.87			

rel cracks etc.

TREAD

IN SATISFACTORY CONDITION AFTER A TOTAL OF 8419.6 MILES/

" TO 1-1/2" LONG - ABRASION ON SURFACE OF TREAD

2

Assigned Tire No. 5Tire Size 16-20Initial Weight 179.47 lbsInflation Pressure (cold) 30 p.s.i.Final Weight 164.73Loss 14.74

BOGIE TIRE

Odom Miles	Actual Miles	Date	1		2		3		TREAD DEPTH		POSITION		8	9	10	Avg Depth	HARDNESS (6 3 R Point)
			Out	In	Out	In	Out	In	Out	In	Out	In					
	0	5-11	.610	.603	.603	.610	.600	.600	.600	.600	.604	.604	.605	.604			54 53 5
	569.3	5-19	.552	.543	.542	.546	.538	.542	.542	.545	.543	.542	.544				
	1434.3	5-23	.50	.490	.487	.499	.500	.490	.496	.488	.499	.492	.495				
	1981.5	5-25	.464	.449	.462	.455	.457	.458	.456	.454	.453	.455	.456				
	2545.8	5-27	.440	.425	.440	.440	.438	.432	.436	.438	.437	.436	.436				52 52 5
	3869.8	6-2	.362	.342	.362	.362	.355	.353	.357	.357	.358	.357	.357				
	5346.4	6-7	.299	.253	.285	.282	.277	.276	.276	.266	.280	.277	.277				50 50 5
	5899.2	6-9	.259	.227	.259	.273	.256	.239	.256	.240	.252	.265	.253				
	6635.4	7-6	.213	.199	.222	.214	.219	.200	.210	.205	.211	.209	.210				54 54 5

REMARKS: - Note mileage, date and result of inspection for cuts, breaks, separation, wheel cracks

5-11 - MEASUREMENTS IMMEDIATELY AFTER INITIAL INFLATION

5-13 - THIS TIRE PUT ON SPARE WACK AT END OF NIGHT SHIFT

5-17 - PUT ON GROUND AND RUN 124.1 MILES DURING NIGHT SHIFT

5-27 - 1", 1/2", 1/2", CUTS TO CORD - SLIGHTLY FUZZY

6-7 - TWO LARGE 2" CUTS - MULTIPLE SMALL CUTS - FUZZY CONDITION

6-13 - TEST TERMINATED BECAUSE OF MECHANICAL FAILURE OF TRUCK - TIRE HOLDS AIR AND IS STILL IN SATIS

7-6 - FINAL INSPECTION: 3", 2" CUTS TO CORD AND MULTIPLE 1/2" TO 1-1/2" CUTS - ABRADED APPEARANCE

Tire Serial No. GN 40127Wheel No. 810 p.s.i.

Ln	HARDNESS (6 3 Random Points)	CROWN RADIUS				WIDTH			O. D.	DEFLECTION		
		1	2	3	Avg	1	2	3		no load height	loaded height	% Def.
1	54 53 54	10-7/8	10-7/8	10-7/8	10-7/8	14-31/32	14-31/32	14-31/32	43.04			
2	52 52 50	11-3/8	11-3/8	11-3/8	11-3/8	15-4/32	15-4/32	15-4/32	43.65			
3	50 50 50	11-5/8	11-5/8	11-5/8	11-5/8	15-7/32	15-7/32	15-7/32	43.33			
4	54 54 52	11-7/8	11-7/8	11-7/8	11-7/8	15-9/32	15-9/32	15-9/32	43.23			

no cracks etc.

TIRE IN SATISFACTORY CONDITION AFTER 6635.4 MILES

GOOD APPEARANCE

2

Assigned Tire No. 6Tire Size 16-20Initial Weight 179.10Inflation Pressure (cold) 36 p.s.i.Final Weight 171.95Loss 7.15

B M G I E T I R E

Odom Miles	Actual Miles	Date	TREAD DEPTH POSITION										AVG Depth	HARD (% 3 Poin
			1 Out	2 In	3 Out	4 In	5 Out	6 In	7 Out	8 In	9 Out	10 In		
	0	3-22												
	0	3-23	.580	.582	.578	.581	.581	.581	.581	.525	.532	.533	.531	54 52
	865	4-18	.528	.530	.531	.528	.534	.529	.531	.533	.532	.530	.531	53 52
	2580.6	4-26	.447	.445	.438	.441	.450	.435	.450	.447	.449	.439	.444	
	3192.5	4-28	.408	.404	.403	.405	.413	.402	.412	.414	.409	.400	.407	52 51
	3720.6	5-2	.371	.378	.378	.378	.392	.374	.380	.385	.375	.372	.378	
	4899.4	5-17	.327	.330	.344	.334	.334	.342	.340	.334	.340	.330	.328	53 54

REMARKS: - Note mileage, date and result of inspection for cuts, breaks, separation, wheel cracks

4-18 - 1/2", 1", 1/2" CUTS TO CORD

4-23 - 1/2", 1/2", 1/2" CIRCULAR. 1", 1" THROUGH 3 PLYS. 1/2", 1/2", 1/2", 1/2", 1", 1/2", 1/2", 1/2",

5-6 - REMOVED FROM TEST - STILL HOLDS AIR

5-17 - FINAL MEASUREMENTS: 1/2", 1/2", 1/2", 1 1/4", 1", 1/2", 1/2", 3/4", 1/2", 1/2", 1", 1" CUTS TO C

THIS TIRE RAN FIRST 123 MILES ON ROGIES. THEN RAN 742 MILES ON FRONT WHEELS, AND THEN RAN REMAINING MILES

TIRE REMOVED FROM TEST ON 5-6 TO START A NEW SET OF ROGIE TIRES ON TEST

Tire Serial No. GN 40130Wheel No. 20

p.s.i.

HARDNESS (6 3 Random Points)	CROWN RADIUS				WIDTH			O. D.	DEFLECTION		
	1	2	3	AVG	1	2	3		no load height	loaded height	% Def.
					15-3/32	15-3/32	15-3/32	43.47			
54 52 51	10-7/8	10-7/8	10-7/8	10-7/8	15-1/8	15-1/8	15-1/8	43.76			
53 52 53	11-1/8	11-1/8	11-1/8	11-1/8	15-13/32	15-13/32	15-13/32	44.37			
52 51 50	11-1/8	11-1/8	11-1/8	11-1/8	15-7/16	15-7/16	15-7/16	44.20			
53 54 55	11-3/8	11-3/8	11-3/8	11-3/8	15-7/16	15-7/16	15-7/16	44.01			

cracks etc.

1/2", 1/2" (THROUGH 3 PLYS 3/4", 1" TO 3 PLY) 1/2" TO 2 PLYS/ 1/2" ONE CUT LUG AT SHOULDER, FUZZY APPEARANCE.

CUTS TO CORD AND NUMEROUS SMALL CUTS - SPIN CUT - FUZZY

1 MILES ON ROAD

2

Assigned Tire No. 7Tire Size 16-20Initial Weight 176.70 LBSInflation Pressure (cold) 30 p.s.i.Final Weight 173.18Loss 3.52

BOGIE TIRE

Odom Miles	Actual Miles	Date	TREAD			DEPTH		POSITION			8	9	10	Avg Depth	HARD (% J fol
			1 Out	2 In	3 Out	4 In	5 Out	6 In	7 Out	8 In					
	0	4-18	.582	.578	.584	.581	.580	.580	.580	.580	.577	.580	.530		54.5
	1047.7	5-11	.500	.489	.500	.490	.494	.495	.500	.500	.494	.498	.496		
	2444.4	5-17	.424	.415	.424	.419	.420	.417	.424	.427	.417	.423	.421		50.7

REMARKS: - Note mileage, date and result of inspection for cuts, breaks, separation, wheel crack

5-17 - 1/2", 1/2", v cut. 1/2", 1/2" CUTS TO CORD - FUZZY

THIS TIRE RAN 39.9 MILES ON RIGHT REAR OF NO. 34 TRUCK AT 36 PSI ON 5-4 AND WAS THEN PUT BACK ON 5

TIRE PUT BACK ON GROUND WHEN NO. 3 FAILED ON 5-7 WITH 30 PSI

2468.7 MI. AT FAILURE ON NIGHT SHIFT 5-17 - ROCK CUT

Tire Serial No.

CN 48235

Wheel No.

5

30

p. 1.

[illegible]

wheel crucks etc.

PUT BACK ON SPARE RACK

2

Assigned Tire No. 8Tire Size 16.20Initial Weight 179.06Inflation Pressure (cold) 36 p.s.i.Final Weight 168.51Loss 10.55

BOGIE TIRE

Odom Miles	Actual Miles	Date	1		2		3		TREAD		DEPTH		POSITION		8	9	10	Avg Depth	HAZD (63 101)
			Out	In	Out	In	Out	In	4	5	Out	In	6	7	In	Out	In		
	0	3-22																	
	0	3-23	.594	.592	.590	.591	.591	.591	.591	.591	.590	.588	.589	.594	.591				50
	2120.6	4-6	.464	.463	.442	.452	.460	.459	.462	.459	.464	.457	.458						50
	2714.2	4-8	.424	.424	.423	.418	.433	.424	.425	.422	.426	.427	.425						
	3307.8	4-12	.412	.394	.400	.385	.416	.412	.399	.388	.403	.400	.401						
	4511.0	4-18	.372	.364	.374	.366	.365	.365	.364	.380	.368	.370	.369						50
	6226.6	4-26	.297	.289	.309	.278	.311	.299	.298	.270	.283	.291	.293						

REMARKS: - Note mileage, date and result of inspection for cuts, breaks, separation, wheel cracks

44,25 OD w/38psi AT 21147.7 ODO

4-6 TWO 1.2" CUTS TO CORD, 3/4 CUT TO CORD 1" TO CORD, 1" TO CORD, 1/2" TO CORD, 3/4" AND 1/2"

4-18 1", 1-1/4" 1-1/2" 1/2" 1/2" 1/2" 1" 1/2" 1 3/4 1/2 1/2 1 3/4 1/2 1" 1" 1/2"

4-26 6270.9 MILES AT FAILURE/ FAILURE CAUSED BY ROCK BREAK/

1

Tire Serial No. GN 40138

Wheel No. 33

p. 1.

[illegible]

oil cracks etc.

1/4" AND 1/2", 1/2", 1/2", 1/2", FUZZY BUT NOT AS BAD AS THE 11,00-20 TIMES.

~~1" 1" 1/2 3/4 1 1/2 1/2 1" 1 1/2 1-1/2 1-1/2 3/4 3/4 1/2 1/2 1/2 1 1/2 1/2 3/4 CURE TO GOOD~~

2

Assigned Tire No. 9Tire Size 16-20Initial Weight 180.31Inflation Pressure (cold) 38 p.s.i.Final Weight 169.35Loss 10.96

FRONT TIRE

Odom Miles	Actual Miles	Date	TREAD DEPTH POSITION										AVE Depth	HARD. (3 Fol.)
			1 Out	2 In	3 Out	4 In	5 Out	6 In	7 Out	8 In	9 Out	10 In		
	0	3-22												
	0	3-23	.589	.595	.590	.589	.587	.589	.588	.585	.580	.588	.533	52
	2417.4	4-6	.500	.509	.501	.503	.498	.504	.502	.499	.500	.502	.502	51
	3011.0	4-8	.490	.498	.485	.488	.485	.484	.480	.484	.485	.485	.435	
	3620.6	4-12	.480	.484	.481	.482	.480	.480	.472	.474	.470	.474	.473	
	4807.8	4-18	.456	.469	.465	.460	.460	.457	.454	.453	.455	.463	.462	50
	6523.4	4-26	.427	.422	.423	.419	.416	.417	.412	.416	.403	.403	.417	
	7135.3	4-28	.399	.402	.404	.404	.405	.398	.378	.394	.390	.400	.397	51
	7663.4	5-2	.385	.382	.385	.390	.376	.380	.376	.369	.384	.371	.378	
36 psi	8842.2	5-6	.352	.352	.353	.358	.355	.357	.342	.353	.339	.346	.351	52
30 psi	8842.2	5-6												
30 psi	10,035.6	5-11	.316	.321	.328	.321	.326	.322	.302	.307	.292	.310	.315	

REMARKS: - Note mileage, date and result of inspection for cuts, breaks, separation, wheel cracks

4-6 1/2", 1/2", 1/4", 1/4", 1/2" CUTS TO CORO. LIGHT FUZZINESS

4-10 1", 1/2", 1/2", 1/2" 1/2 1/2 3/4 1/2 1/2 1/2 1/2 1/2 1" 1/2 1/2 1/2 1/2 3/4 3/4

4-28 1-1/2" TO ONE PLY 1/4 1/4 1/4 1/4 1/4 1/4 1/2 1/2 1/2 1/2 3/4 3/4 1/2 3/4 1/2

172.38 LBS ON 5-6 - TIRE HAD LOST 7.93 LBS IN 8842.2 MILES

5-13 - LEAKS AIR THROUGH TREAD CRACKS - REMOVED FROM TEST AFTER 10,574.8 MILES OF SERVICE

1

Tire Serial No. GN 31314

Wheel No. 16

8 p.s.i.

n	HARDNESS (6 3 Random Points)	CROWN RADIUS				WIDTH			O. D.	DEFLECTION		
		1	2	3	AVG	1	2	3		no load height	loaded height	% Def.
						14-15/16	14-15/16	14-15/16	43.40			
	52 53 52	10-7/8	10-7/8	10-7/8	10-7/8	15.00	15.00	15.00	43.65	10.6875	9.0625	15.2
	51 52 52	10-7/8	11-1/8	10-5/8	10-7/8	15-9/32	15-9/32	15-9/32	44.22			
										11.0625	9.3438	15.5
	50 52 54	10-7/8	11-1/8	10-7/8	10.958	15-1/4	15-1/4	15-1/4	44.11			
	51 54 52	10-7/8	11-3/8	10-7/8	11.042	15-7/32	15-7/32	15-7/32	44.04			
	52 50 51	10-7/8	11-3/8	11-3/8	11.208	15-7/32	15-7/32	15-7/32	43.87			
									43.83			

all cracks etc.

3/4 3/4 1/2 1/2 1 1/2 1/2 1 CUTS TO CORD

3/4 1/2 1" (TO 2 PLYS) 1/2 1" 1/2 1/2 3/4 (TO 2 PLYS) 1/2 (TO 2 PLYS) 3/4 1/2 1/2 1-1/4 1/2 1/2 CUTS TO CORD

SERVICE

2

Assigned Tire No. 10Tire Size 18-20Initial Weight 102.11 lbsInflation Pressure (cold) 36 p.s.i.Final Weight 181.56 (AT END 36 PSI TEST)Loss .55

FRONT TIRE

169.33 LBS AT END 30 PSI TEST

Odom Miles	Actual Miles	Date	1		2		3		TREAD		DEPTH		POSITION		8	9	10	Avg Depth	HARDIE (4 3 7 Join)
			Out	In	Out	In	Out	In	4	5	6	7	8	9					
	0	5-4	.575	.582	.573	.577	.572	.581	.573	.579	.570	.573	.578						54 53
36 psi	593.6	5-6	.536	.547	.534	.543	.535	.541	.542	.546	.540	.544	.541						50 50
30 psi	593.6	5-6																	
	1787.0	5-11	.500	.504	.486	.505	.499	.497	.501	.500	.501	.500	.499						
	3183.7	5-17	.459	.460	.450	.459	.459	.455	.458	.457	.466	.459	.458						52 52
	3777.3	5-19	.445	.443	.427	.434	.442	.439	.439	.433	.450	.447	.440						
	4642.3	5-23	.412	.410	.404	.400	.406	.393	.408	.393	.410	.407	.404						
	4892.7	5-25	.400	.412	.390	.396	.400	.378	.389	.374	.402	.398	.394						
	5457.0	5-27	.381	.384	.378	.380	.389	.369	.388	.360	.385	.378	.379						52 53
	6781.0	6-2	.342	.339	.349	.335	.336	.334	.325	.320	.345	.340	.337						
	8257.6	6-7	.273	.286	.264	.289	.266	.273	.264	.265	.271	.276	.273						53 54
	8810.4	6-9	.268	.274	.255	.271	.265	.270	.261	.256	.266	.267	.265						
	9546.6	7-6	.226	.230	.222	.230	.222	.232	.235	.234	.250	.239	.232						54 54

REMARKS: - Note mileage, date and result of inspection for cuts, breaks, separation, wheel cracks

THIS TIRE PUT ON R.F. DURING ROTATION AT NOON 5-4 - INFLATED TO 36 PSI/ AT NOON 5-6, IT STARTED 30 P

WEIGHT 181.56 LBS ON 5-6

5-17 - 1/2" CUT TO CORD - FUZZY - TWO CROSS CUTS - SHALLOW

5-27 - 1/2", 1/2", 1/2", 1/2", 1/2" CROSS CUT 3", 1" CUTS TO CORD - (CROSS CUT IS NOT TO CORD)

6-7 - CURPING, 1", 1/2", 1/2", 1/2", 1", 1/2", 1/2", 1-1/4", 1/2", 3/4", 3/4", 1" CUTS TO CORD,

1/2", 1", 1/2", 1/2" CUTS TO CORD - FUZZY

6-13

TEST TERMINATED BECAUSE OF MECHANICAL FAILURE OF TRUCK - TIRE HOLDS AIR AND IS IN SATISFACT

1", 1/2", 1/2", 1/2", 1/2", 1-1/4", 2", 1/2", 1/2", 1", 1/2", 1/2", 1", 3/4", 1/2", 1/2", 1

Tire Serial No. GN 48176Wheel No. 3138 p.s.i.

TEST

T	HARDNESS (% 3 Random Points)	CROWN RADIUS				WIDTH			O. D.	DEFLECTION		
		1	2	3	AVG	1	2	3		no load height	loaded height	% Def.
8	54 55 54	11-1/8	11-1/8	11-1/8	11-1/8	15-1/4	15-1/4	15-1/4	44.07			
1	50 50 50	10-7/8	10-7/8	10-7/8	10.875	15-9/32	15-9/32	15-9/32	44.33			
									44.25			
9												
8	52 52 52	10-7/8	10-5/8	10-5/8	10.708	15-1/4	15-1/4	15-1/4	44.14	10.9375	9.09375	16.9
0												
4												
4												
9	52 53 52	10-5/8	10-5/8	10-7/8	10.71	15-1/4	15-1/4	15-1/4	43.95			
7										10.8125	9.0625	16.2
3	53 54 54	11-1/8	10-7/8	10-7/8	10.96	15-5/16	15-5/16	15-5/16	43.80			
5												
2	54 54 54	11-1/8	11-1/8	11-1/8	11.125	15-1/4	15-3/8	15-3/8	43.69			

heel cracks etc.

STARTED 30 PSI OPERATION.

TO CONO

ITS TO CONO, 2" SIDE CUT.

IN SATISFACTORY CONDITION AFTER 9546.6 MILES

/2", 1/2", 1/2", 1" CUTS TO CONO, LIGHT CURRING

2

Tire Size 16-20

Inflation Pressure (cold) 30 p.s.i.

Final weight 160.69

Loss 20.38

BOGIE TIRE

[illegible]

REMARKS: - Note mileage, date and result of inspection for cuts, breaks, separation, wheel cracks

5-6 - MEASUREMENTS IMMEDIATELY AFTER AIRING FOR FIRST TIME

5-27 - MANY SMALL 1/2" TO 1" CUTS AND ONE V CUT IN CENTER - SOMEWHAT FUZZY APPEARANCE

6-7 - ONE LARGE 2" CUT MULTIPLE SMALL CUTS - FUZZY

TIRE FAILED FROM ROCK BREAK ON MORNING OF 6-10 AFTER 8344.4 MILES OF SERVICE

1

Tire Serial No. GN 49329

Serial No. 21

30 p.m.i.

[illegible]

1001 cracks etc.

C 11

2

Time Size 16.20

Initial Weight 181.76 gm

Inflation Pressure (cold) 36 p.s.i.

Final Weight (NOT AVAILABLE)*

Lost _____

BOGIE TIRE

[illegible]

REMARKS: - Note mileage, date and result of inspection for cuts, breaks, separation, wheel cracks and

44.29 G.D. AT 21147.7 MILES W/38PSI

4-6 - 1/2", 1/2", 1/2", 1/2", 1" CUTS TO COND - FUZZY BUT NOT AS BAD AS 11, 00 - 20.

FAILURE DURING NIGHT SHIFT 4-15 - TIRE HAD LARGE SPIKE IN IT BUT IT DIDN'T PENETRATE LEAK APPARENTLY C

FAILURE CAUSED BY PROBABLE ROCK CUT - TIRE SUBSEQUENTLY APPARENTLY RAN FLAT A SHORT DISTANCE ON CRD

* FINAL WEIGHT NOT AVAILABLE - TINE THREAD WAS SECTIONED FOR SAMPLE

Tire Serial No. GN 32842

Wind No. 2

 p.8.1.

[illegible]

cracks etc.

APPARENTLY CAUSED BY CUT - TIRE RAN FLAT AND WAS DAMAGED. FAILED AFTER TOTAL 4566 MI/

ANCE ON CROSS-COUNTRY COURSE: -- 4566 TOTAL MILES AT FAILURE

2

Assigned Tire No. 13Tire Size 16 20Initial Weight 182.90 lbsInflation pressure (cold) 36 p.s.i.Final Weight 173.73Loss 9.17

BOGIE TIRE

Odom Miles	Actual Miles	Date	TREAD		DEPTH		POSITION		8 In	9 Out	10 In	Avg Depth	HARD- (6 3 Foin	
			1 Out	2 In	3 Out	4 In	5 Out	6 In						7 Out
21147.7	0	3-31	.604	.605	.602	.605	.601	.605	.603	.605	.606	.602	.604	50
	843.4	4-8	.527	.523	.526	.528	.525	.528	.524	.530	.525	.524	.523	
	1436.9	4-12	.498	.494	.498	.496	.493	.497	.492	.496	.494	.495	.495	
	2640.2	4-18	.455	.453	.462	.457	.452	.460	.453	.455	.456	.451	.455	50
	4059.0	4-26	.393	.394	.401	.388	.389	.340	.386	.394	.385	.373	.385	
	4670.9	4-28	.370	.366	.370	.371	.361	.355	.365	.360	.362	.355	.364	
	5785.1	5-17	.325	.314	.317	.311	.320	.310	.309	.301	.300	.303	.311	50

REMARKS: - Note mileage, date and result of inspection for cuts, breaks, separation, wheel crack

THIS TIRE INSTALLED ON NO. 12 TRUCK AT 21147.7 ODO ON THE LF TANDEN WHILE NO. 14 IS BEING REPAI

4-18 1/2 1/2 1/2 1, 3/4, 1/2, 1/2, 1/2, 1/2, 1, 1/2, 1/2, 1, 1 CUTS TO COND

4-28 1" 3/4, 1/2 1/2 1/2 1/2 1/2 1/2 1/2 1/2 3 CORNER 1/2, 1", 1/2 1/2 1/2 1/2 1/2

5-17 MULTIPLE 1/2" TO 1-1/4" CUTS - FUZZY

AFTER 5785.1 MILES OF SERVICE THIS TIRE WAS REMOVED IN SATISFACTORY CONDITION TO START A NEW

1

File Serial No. GN 40154

Wheel No. 6

P.8.1.

[illegible]

is also etc.

REF ID: A6110

1/2 1/2 1" 1 1/2 1/2 1 WITH NUMEROUS OTHER SMALL CUTS/

NEW SET OF BODIE TINGS ON TEST AT 30 FBI ON 5-6-1960

2

Tire Size 16 20

Initial Weight 177.31

Inflation pressure (cold) 38 p.s.i.

Final Weight 174.24

Loan 3.07

BOGIE TIRE

[illegible]

REMARKS: - Note mileage, date and result of inspection for cuts, breaks, separation, wheel cracks

TIRE HAD A NAIL PUNCTURE WHEN IT FINISHED MORNING SHIFT 3-31 - REMOVED, REPAIRED AND PUT IN SERV

4-6 1/2, 1", 1", 1/2, 1/2, 1/2, 1/2, 1/2, 3 CORNER 1/2, 1/2, 1/2, 1/2 CUTS TO COND. FUZZY - NON

TIRE FAILED DUE TO ROCK "X" BREAK AFTER 2373.4 MILES OF SERVICE ON MORNING SHIFT OF 4-7-60.

1

Wheel No. 29

36 **p.8.1.**

[illegible]

wheel cracks etc.

0 PUT IN SERVICE AGAIN BEFORE NITE SHIFT STARTED ON 4-1-60

3. FUZZY FROM ABRASION

of 4-7-60. 2373.4 MILES AT FAILURE

2

Assigned Tire No. 15Tire Size 16 20Initial Weight 180.46Inflation Pressure (cold) 36 p.s.i.Final Weight 174.03Loss 6.43

FRONT TIRE

Odom Miles	Actual Miles	Date	TREAD		DEPTH		POSITION		8 In	9 Out	10 In	Avg Depth	HARD (4 3 Poi	
			1 Out	2 In	3 Out	4 In	5 Out	6 In						7 Out
	0	3-22												
	0	3-23	.580	.580	.581	.585	.580	.585	.581	.578	.580	.580	.581	52
	2417.4	4-6	.500	.500	.500	.499	.498	.504	.504	.499	.501	.502	.501	50
	3011.0	4-8	.480	.486	.477	.482	.485	.482	.485	.480	.482	.488	.483	
	3620.6	4-12	.460	.480	.474	.475	.468	.476	.468	.472	.462	.476	.471	
	4065.8	4-18	.450	.456	.461	.460	.470	.469	.460	.459	.448	.469	.460	50
	5781.4	4-26	.417	.438	.420	.439	.423	.439	.436	.429	.428	.427	.429	
	6393.3	4-28	.404	.414	.398	.415	.420	.405	.425	.408	.408	.409	.411	54
	6921.4	5-2	.378	.400	.387	.405	.393	.395	.390	.392	.390	.399	.393	

REMARKS: - Note mileage, date and result of inspection for cuts, breaks, separation, wheel cracks

4-6 SIX 1/2" CUTS TO FLY AND A 2" SIDE CUT

4-18 1/2 1/2 3/4 3/4 1/2 1/2 1/2 1/2 CUTS TO BOND

4-28 1", 1/2" 3/4, 1/2 1/2 1" 1/2" 1/2" 1/2" 1" 1" 3/4" 1/2" 1/2 1/2 1/2

5-4 DURING MORNING SHIFT, AFTER HAVING ACCUMULATED A TOTAL OF 7466.7 MILES A STONE CUT CAUSED

1

Tire Serial No. GN 32865Wheel No. 13 p.s.i.

th	HARDNESS (4 3 Random Points)	CROWN RADIUS				WIDTH			O. D.	REFLECTION		
		1	2	3	AVG	1	2	3		no load height	loaded height	% Def.
						15.00	15.00	15.00	43.3			
	52 54 54	10-5/8	10-5/8	10-5/8	10-5/8	15-3/32	15-3/32	15-3/32	43.8	10.96875	9.4375	14.0
	50 50 51	10-5/8	10-5/8	10-5/8	10-5/8	15-11/32	15-11/32	15-11/32	44.25			
										11.0625	9.3125	15.8
	50 53 53	10-7/8	10-7/8	10-7/8	10-7/8	15-3/16	15-3/16	15-3/16	44.10			
	54 53 53	10-7/8	10-7/8	10-7/8	10-7/8	15-11/32	15-11/32	15-11/32	44.13			

heel cracks etc.2 1/2 1/2 1" 1/2 CUTS TO CONDHE CUT CAUSED FAILURE OF THIS TIRE

2

Assigned Tire No. 18Tire Size 16 20Initial Weight 177.91 lbsInflation Pressure (cold) 36 p.s.i.Final Weight 165.91Loss 12.00

BOGIE TIRE

Odom Miles	Actual Miles	Date	TREAD			DEPTH		POSITION		8	9	10	Avg Depth	HARD: (63 foin
			1 Out	2 In	3 Out	4 In	5 Out	6 In	7 Out					
21147.7	0	3-31	.601	.601	.600	.600	.600	.600	.603	.599	.601	.600	.601	50
	1187.2	4-6	.500	.495	.499	.504	.502	.501	.512	.500	.504	.502	.502	50
	1730.8	4-8	.472	.471	.470	.462	.470	.472	.475	.468	.470	.466	.470	
	2390.4	4-12	.447	.432	.460	.442	.452	.444	.454	.438	.456	.430	.446	
	4848.0	4-26	.360	.380	.362	.360	.362	.362	.376	.360	.372	.359	.365	
	5459.9	4-28	.311	.325	.329	.331	.319	.316	.335	.326	.314	.325	.323	50
	5988.0	5-2	.290	.284	.292	.314	.298	.282	.310	.284	.297	.282	.293	
	7166.8	5-17	.224	.241	.245	.238	.259	.242	.271	.228	.231	.241	.242	54

REMARKS: - Note mileage, date and result of inspection for cuts, breaks, separation, wheel cracks

THIS TIRE INSTALLED ON LR OF TRUCK NO. 12 AT 21,147.7 ODO TO REPLACE FAILED NO. 17

4-6 1/2, 1/2, 1/2, 1/2, 1/2, 1/2 1/2 CUTS TO CORD - FUZZY

4-28 NUMEROUS SMALL CUTS.

5-17 MULTIPLE CUTS TO CORD 1/2" TO 1-1/2" - FUZZY

REMOVED FROM TEST ON 5-6-60 IN SATISFACTORY CONDITION AFTER 7166.8 MILES TO START A NEW SET

1

Tire Serial No. 1 60 06070

Wheel No. 24

p.s.i.

n	HARDNESS (* 3 Random points)	CROWN RADIUS				WIDTH			O. D.	DEFLECTION		
		1	2	3	Avg	1	2	3		no load height	loaded height	% Def.
1	50 50 50	10 7/8	10 7/8	10 7/8	10 7/8	15-1/16	15 1/16	15-1/16	43.55			
2	50 50 50	11-1/8	11-1/8	11-3/8	11.208	15-13/32	15-13/32	15-13/32	44.25			
3												
5										10.9063	9.0625	16.9
5												
3	50 52 52	11-5/8	11-5/8	11-7/8	11.71	15-3/8	15-3/8	15-3/8	43.95			
3												
2	54 54 53	11-5/8	11-5/8	11-5/8	11-5/8	15-11/32	15-11/32	15-3/8	43.80			

see cracks etc.

A NEW SET OF TIRES ON TEST

2

Tire Size 16.20

Inflation Pressure (cold) 36 p.s.i.

Loan **2.34**

BOGIE TIRE

[illegible]

REMARKS: - Note mileage, date and result of inspection for cuts, breaks, separation, wheel cracks

TIRE FAILED FROM A CUT AT 21,108.2 MILES AFTER 1186. MILES OF SERVICE ON MORNING SHIFT 3:31

Wheel No. 2

p. 8. 1.

[illegible]

el cracks etc.

τ 3-31

2

Assigned Tire No. 18Tire Size 16 20Initial Weight 181.22Inflation Pressure (cold) 30 psiFinal Weight 168.95Loss 12.27

FRONT TIRE

Odom Miles	Actual Miles	Date	THREAD DEPTH POSITION												HAZ (F
			1 Out	2 In	3 Out	4 In	5 Out	6 In	7 Out	8 In	9 Out	10 In	Avg Depth		
	0	4-8	.600	.602	.600	.605	.600	.604	.602	.604	.602	.605	.602		
	296.8	4-18	.567	.568	.566	.568	.566	.570	.568	.572	.564	.570	.568	5	
	789.4	5-2	.528	.528	.530	.535	.527	.530	.530	.530	.528	.527	.529		
	2192.2	5-17	.496	.492	.495	.495	.492	.493	.490	.495	.494	.489	.493	5	
	2785.8	5-19	.478	.476	.473	.477	.475	.480	.471	.480	.471	.475	.476		
	3650.8	5-23	.452	.446	.455	.455	.451	.452	.447	.452	.451	.440	.450		
	4198.0	5-25	.430	.419	.432	.419	.432	.422	.429	.431	.430	.415	.426		
	4762.3	5-27	.401	.394	.408	.399	.388	.408	.410	.410	.414	.403	.404	52	
	6086.3	6-2	.354	.360	.364	.364	.362	.364	.352	.373	.338	.368	.360		
	7562.9	6-7	.300	.300	.304	.312	.311	.312	.304	.324	.316	.312	.310	51	
	8115.7	6-9	.290	.296	.300	.308	.288	.296	.292	.311	.300	.295	.298		
	8851.9	7-6	.245	.275	.244	.275	.250	.267	.256	.280	.253	.266	.261	53	

REMARKS: - Note mileage, date and result of inspection for cuts, breaks, separation, wheel crack

4-15 NOON - TIRE STARTED TEST IN PLACE OF NO. 16 (WHICH HAD A SLOW LEAK)

4-18 1/2", 1", CUTS TO CORD

5-17 1/2", 1", 1/2" CUTS TO CORD WITH SOME LONG CUTS IN TREAD WHICH ARE SHALLOW IN DEPTH

5-27 1/2", 1/2", 1/2", 1-1/4", 3/4", 1/2", 3/4", 3/4", 1/2", 1" CUTS TO CORD. LARGE SHALLOW S

6-7 1", 1", 1", 1/2", 1/2", 1" (CROSSWAYS) 1", 3/4", 1", 1", 1/2", 1", 1", 1/2", 1/2", 1/2", 1/2

* TIRE RAN 1334.7 MILES ON ROGIES WITH 36 PSI, THEN STARTED RUNNING ON FRONT WITH 30 PSI ON HIG

6-13 TEST TERMINATED BECAUSE OF MECHANICAL FAILURE OF TRUCK - TIRE HOLDS AIR AND IS IN SATISFACT

1", 1", 1-1/4", 1-1/4", 1", 1", 1", 3/4", 1/2", 1" CUTS TO CORD, SHALLOW CROSS CUT, SHALLOW

17

Tire Serial No. CN 40143

Wheel No. 1

p.s.i.

HARDNESS (6 3 Random Points)	CROWN RADIUS				WIDTH			O. D.	DEFLECTION		
	1	2	3	AVG	1	2	3		no load height	loaded height	% Def.
52 54 54	11 1/8	11 1/8	11 1/8	11.1	15 1/16	15 1/16	15 1/16	43.19			
53 50 50	11-3/8	11-3/8	11-3/8	11-3/8	15-5/16	15-5/16	15-5/16	43.87			
53 53 52	11-1/8	10-7/8	11-1/8	11.04	15-9/32	15-9/32	15-9/32	43.76			
52 52 52	11-1/8	11-1/8	11-3/8	11.21	15-1/4	15-1/4	15-1/4	43.59			
51 51 50	11-3/8	11-3/8	11-3/8	11-3/8	15-9/32	15-9/32	15-9/32	43.41			
53 55 53	11-3/8	11-3/8	11-3/8	11-3/8	15-1/4	15-1/4	15-1/4	43.10			

el cracks etc.

HALLOW SPIN CUT

1/2", 1/2", 1/2", 1", 1/2", 1/2", 3/4", 1", 1", 1" CUTS TO CORD - CURPING

PSI ON NIGHT SHIFT 5.13

ATISFACTORY CONDITION AFTER A TOTAL OF 8851.9 MILES

SHALLOW SIDE SPIN CUT, 1", 1", 1", 1" CUTS TO CORD - CURPED

2

Tire Size 11.00 20

Inflation Pressure (cold) 45 p.s.i.

Recal Weight (NAMAORO)

Leus

BOGIE TIRE

[illegible]

REMARKS: - Note mileage, date and result of inspection for cuts, breaks, separation, wheel cracks

CUTS: 1/2" THROUGH ONE LAYER OF CORD. 4 MORE THROUGH 2 CORDS 1/2" LONG - 1" CUT TO CORN, 1"

FROM ABHAYION.

FAILURE - UNKNOWN CAUSE. RAPIDLY DAMAGED FROM APPARENTLY RUNNING FLAT - FAILED ON APRIL 6 DURING

2446.9 MILES OF SERVICE

Time Serial No.

Wheel No.

p.8.1.

[illegible]

cool crutches etc.

TO CORD, 1" THROUGH THREE LAYERS, 3/4" THROUGH 3 LAYERS 2 MON. 1/2" CUTS TO CORD, TINE VERY FUZZY APPEARANCE

PHIL 6 DURING NIGHT SHIFT.

2

Assigned Tire No. 31Tire Size 11.00 20Initial Weight 219.16Inflation Pressure (cold) 45 p.s.i.Final Weight 199.62Loss 15.54

BOGIE TIRE

Odom Miles	Actual Miles	Date	TREAD		DEPTH		POSITION		8 In	9 Out	10 In	Avg Depth	HARDN (% 3 : Foin	
			1 Out	2 In	3 Out	4 In	5 Out	6 In						7 Out
	0	3-22												
	0	3-23	.632	.622	.628	.628	.632	.625	.627	.632	.628	.625	.628	53.5
	2714.4	4-6	.442	.400	.405	.390	.425	.432	.428	.422	.425	.386	.416	52.5
	3011.0	4-8	.378	.344	.385	.345	.388	.354	.370	.338	.378	.332	.359	
	3620.6	4-12	.340	.293	.326	.295	.334	.308	.317	.291	.348	.298	.315	
	4807.8	4-18	.280	.272	.258	.271	.274	.259	.284	.259	.255	.246	.266	50.5

REMARKS: - Note mileage, date and result of inspection for cuts, breaks, separation, wheel cracks

4-6 2. THREE CORNERED CUTS ABOUT 1" LONG, STRAIGHT CUT 1/2", STRAIGHT CUT 3/4", GAUGED OUT PI

4-18 NUMEROUS ADJOINING CUTS TO GORD WITH CONSIDERABLE ABRASION, SMALL PIECES OF RUBBER CUT AW

WORN OUT AFTER 5729.8 MILES OF SERVICE - REMOVED FROM TEST AT NOON ON 4-21-60 - STILL HOLDS AIR

Wheel Co.

p. 8. 1.

[illegible]

cracks etc.

END OUT PIECE OF LOG, NUMEROUS SMALL CUTS AND ABRASIONS, CUT THROUGH 3 PLYS - TIRE IN POOR CONDITION. QUILT LUXURY

KEEP CUT AWAY

HOLDS AIR OK

2

Assigned Tire No. 32Tire Size 11.00 20Initial Weight 215.35Inflation Pressure (cold) 45 p.s.i.Final Weight 200.55Loss 14.80

BOGIE TIRE

Odom Miles	Actual Miles	Date	TREAD			DEPTH		POSITION			Avg Depth	HARDY (w) 3 Foin		
			1 Out	2 In	3 Out	4 In	5 Out	6 In	7 Out	8 In			9 Out	10 In
	0	3-22												
	0	3-23	.624	.616	.618	.617	.618	.618	.622	.618	.621	.616	.619	52 50
	2190.0	4-6	.399	.404	.391	.395	.414	.391	.404	.395	.402	.400	.400	52 5
	2783.6	4-8	.348	.361	.354	.349	.360	.349	.365	.344	.360	.334	.352	
	3393.2	4-12	.332	.323	.330	.309	.338	.310	.328	.315	.323	.312	.322	
	4580.4	4-18	.266	.266	.261	.245	.280	.251	.261	.260	.240	.271	.260	50 51
	6356.0	5-18	.151	.141	.119	.130	.151	.108	.125	.114	.141	.113	.130	53 55

REMARKS: - Note mileage, 5 and result of inspection for cuts, breaks, separation, wheel cracks

THIS TIRE GOT A NAIL PUNCTURE AT 18642.4 MILES - REPAIRED AND PUT IN SERVICE AGAIN AT 18870.2 MIL

4-6 3 1/2" CUT TO GOOD 2-1" CUTS TO GOOD - FUZZY FROM ABRASION

4-18 NUMEROUS SMALL ABIDING CUTS AND ABRASIONS AND SMALL PIECES OF RUBBER LOGS CHIPPED OFF

5-18 FINAL MEASUREMENT

11

Wheel No. _____

5 p. 8.1.

oil cracks etc.

18870.2 MILES - IT MISSED 227.8 MILES

UPPED OFF/ 6356.0 MILES WHEN REMOVED FROM TEST. WORN OUT.

91

Assigned Tire No. 33Tire Size 11.00 20Initial Weight 215.00Inflation Pressure (cold) 45 p.s.i.Final Weight Loss

BOGIE TIRE

Odom Miles	Actual Miles	Date	TREAD DEPTH POSITION										Avg Depth	HARDNESS (% 3 R Join)
			1 Out	2 In	3 Out	4 In	5 Out	6 In	7 Out	8 In	9 Out	10 In		
	0	3-22												
	0	3-23	.619	.615	.618	.618	.618	.620	.619	.616	.622	.616	.618	54 53
	2417.4	4-6	.398	.408	.408	.409	.411	.407	.419	.422	.400	.404	.409	50 51
	3011.0	4-8	.350	.366	.371	.365	.370	.369	.385	.364	.364	.368	.367	
	3620.6	4-12	.323	.357	.341	.336	.330	.335	.345	.333	.337	.333	.337	52 52
	4807.8	4-18	.266	.287	.297	.294	.294	.293	.303	.289	.278	.288	.289	
	6583.4	4-26	.174	.189	.210	.193	.173	.187	.183	.182	.188	.184	.186	
	7195.3	4-28	.168	.174	.174	.160	.165	.178	.166	.158	.170	.170	.168	50 50

REMARKS: - Note mileage, date and result of inspection for cuts, breaks, separation, wheel cracks

1 2" CUT TO CORD, 1-1/4" TO CORD 1" TO CORD 1/2" TO CORD 1, 2 TO CORD 1/2 TO CORD 3 CORNERED 1

4-18 NUMEROUS ADJOINING CUTS ABOUT 1/4" TO 1-1/2" WITH ABRASION AND SMALL CHIPS OUT OF TREAD

4-28 NUMEROUS CUTS - VERY FUZZY AND ABRASION.

FAILED AFTER 7228.7 MILES OF SERVICE ON THE NIGHT SHIFT ON 4-28-60

Tire Serial No. GN 35270

Wheel No. _____

p.s.i.

HARDNESS (4 3 Random Points)	CROWN RADIUS				WIDTH			O. D.	DEFLECTION		
	1	2	3	AVG	1	2	3		no load height	loaded height	% Def.
					11-1/2	11-13/32	11-13/32	42.67			
54 55 55	8-7/8	8-7/8	8-7/8	8.875	11-1/2	11-1/2	11-1/2	42.80	9.9375	8.2187	17.3
50 51 50	10-5/8	10-5/8	10-5/8	10.625	11-25/32	11-25/32	11-25/32	42.80			
52 52 53									9.812	8.281	15.6
	10-5/8	10-5/8	11-1/8		11-13/16	11-13/16	11-13/16	42.55			
50 50 51	11-3/8	11-3/8	11-3/8	11-3/8	11-25/32	11-25/32	11-25/32	42.30			

1 cracks etc.

CORNERED 1/2" CUT TO CORD 1" CUT TO CORD, 3/4" CUT TO CORD, 1/2" CUT TO CORD 1" CUT TO CORD, FUZZY FROM ABRASION
 IT OF TREAD/

2

Assigned Tire No. 34Tire Size 11.00 20Initial Weight 209.42Inflation Pressure (cold) 49 p.s.i.Final Weight 193.25Loss 16.17

FRONT TIRE

Odom Miles	Actual Miles	Date	TREAD DEPTH POSITION										Avg Depth	HARD (63 foi)
			1 Out	2 In	3 Out	4 In	5 Out	6 In	7 Out	8 In	9 Out	10 In		
	0	3-22												
	0	3-23	.610	.609	.610	.609	.610	.606	.610	.605	.609	.610	.609	55
20068.1	2417.4	4-6	.480	.470	.472	.471	.468	.471	.469	.466	.471	.472	.471	52
	3011.0	4-8	.451	.439	.436	.445	.438	.445	.441	.434	.442	.444	.442	
	3620.6	4-12	.432	.419	.425	.418	.425	.428	.429	.419	.444	.419	.426	
	4807.8	4-18	.408	.392	.396	.421	.398	.400	.397	.392	.398	.402	.400	53
	6583.4	4-26	.325	.312	.310	.315	.312	.318	.310	.300	.344	.315	.316	
	7195.3	4-28	.300	.284	.286	.295	.283	.300	.291	.283	.300	.293	.292	54
	7723.4	5-2	.262	.250	.259	.278	.244	.269	.254	.245	.258	.253	.257	
	8902.2	5-6	.226	.208	.225	.226	.205	.235	.221	.205	.226	.217	.219	
	9480.4	5-9	.217	.196	.206	.210	.192	.215	.203	.206	.200	.210	.206	50
	10095.6	5-11	.175	.160	.180	.178	.164	.187	.172	.152	.182	.176	.173	
	11492.3	5-17	.121	.110	.112	.133	.112	.132	.122	.116	.109	.128	.120	54

12085.3 6-22 .116 .091 .120 .118 .094 .124 .110 .119 .113 .103 .111 55
 REMARKS: - Note mileage, date and result of inspection for cuts, breaks, separation, wheel cracks

4-6 3/4 CUT IN CENTER TO CORD. 1/2 x 1, 2 CUT TO CORD. 3/4 CUT TO CORD, 1/2" CUT TO CORD, 1/2"

4-18 1/2, 1, 1/2 1/2, 3/4, 1-1/4, 1", 1/2, 3/4, 3/4, 3/4, 3/4, 3/4, 1, 3/4, 1/2, 3/4,

4-28 NUMEROUS CUTS 1/4" TO 1" WITH ABRASION.

5-9 MANY CUTS 1/4" TO 1-1/2"

5-17 VERY FUZZY - WHOLE SERIES OF CUTS AND ABRASIONS - ONE SMALL CHUNK OUT TO CORD - ABOUT 1

5-19 TIRE REMOVED FROM TEST - WORN OUT - CHIPS OF RUBBER MISSING - MANY CUTS THROUGH SEVERAL

TOTAL MILEAGE WAS 12,085.9 - STILL HOLDS AIR

1

Tire Serial No. XA 45255

Wheel No. _____

1 p.s.i.

HARDNESS (6 J Random Points)	CROWN RADIUS				WIDTH			O. D.	DEFLECTION		
	1	2	3	AVG	1	2	3		no load height	loaded height	Def.
					11-13/32	11-13/32	11-13/32	42.60			
55 55 55	8-7/8	8-7/8	8-7/8	8.875	11-1/2	11-1/2	11-1/2	42.76	9.6875	8.3125	14.2
52 52 55	9-7/8	9-7/8	9-7/8	9.875	11-23/32	11-23/32	11-23/32	42.86			
								42.70	9.719	8.281	14.8
53 53 53	9-7/8	9-7/8	9-7/8	9-7/8	11-23/32	11-23/32	11-23/32				
54 54 54	10-3/8	10-1/8	10-3/8	10.29	11-3/4	11-3/4	11-3/4	42.50			
50 50 51	10-7/8	10-3/8	10-3/8	10.54	11-3/4	11-3/4	11-3/4	42.28			
54 54 54	10-3/8	10-7/8	10-7/8	10.71	11-11/16	11-11/16	11-11/16	42.12	9.406	8.00	14.9

55 56 57 11-1/8 11-1/8 11-1/8 11-1/8 11-3/4 11-3/4 11-3/4 42.05
sl cracks etc.

CORD, TIRE HAS FUZZY APPEARANCE TO TREAD FROM ABRASION

1/2, 3/4, 1/2, 1, INCH CUTS TO CORD/

- ABOUT 1/2" x 3/4"

ON SEVERAL LAYERS OF CORD - MULTITUDE OF SMALL CUTS - VERY FUZZY APPEARANCE

2

Assigned Tire No. 35Tire Size 11.00 20Initial Weight 217.88Inflation Pressure (cold) 45 p.s.i.Final Weight 201.87Loss 16.01

BOGIE TIRE

Odom Miles	Actual Miles	Date	TREAD			DEPTH		POSITION		8	9	10	Avg Depth	HAIR (63 101)
			1 Out	2 In	3 Out	4 In	5 Out	6 In	7 Out					
	0	3-22												
	0	3-23	.613	.616	.618	.616	.621	.622	.618	.618	.622	.615	.618	52
	792.9	4-8	.538	.526	.538	.532	.544	.535	.542	.529	.537	.528	.535	
	1402.5	4-12	.485	.475	.483	.480	.490	.477	.493	.478	.489	.470	.482	52
	2589.7	4-18	.412	.398	.409	.388	.411	.393	.425	.403	.412	.396	.405	
	4365.3	4-26	.295	.267	.285	.264	.275	.260	.292	.287	.278	.273	.278	
	4977.2	4-28	.265	.249	.260	.259	.252	.241	.280	.280	.258	.253	.260	52
	5505.5	5-2	.224	.217	.218	.210	.221	.204	.236	.225	.226	.213	.219	
	6684.1	5-6	.205	.170	.185	.180	.196	.174	.182	.174	.172	.170	.181	
	7262.3	5-9	.158	.137	.147	.139	.158	.130	.164	.149	.158	.146	.149	53
	7877.5	5-11	.116	.115	.105	.095	.101	.120	.106	.141	.104	.104	.111	
	8383.8	6-22	.092	.080	.085	.089	.104	.083	.115	.102	.108	.097	.095	55

REMARKS: - Note mileage, date and result of inspection for cuts, breaks, separation, wheel crack:

4-18 3/4", 1/2", 1/2", 1", 3/4", (SMALL CHIP IN LUG) CUTS TO CORD

4-28 NUMEROUS CUTS 1/4" TO 1" - FUZZY

5-9 ONE 2" CUT - MANY SMALL 1/4" TO 1" CUTS

5-13 REMOVED FROM TEST - WORN OUT AND CUT - STILL HOLDS AIR - TOTAL MILEAGE 8383.8

11

Tire Serial No. XA 45260

Wheel No. _____

 p.s.i.

	HARDNESS (4 3 Random points)	CROWN RADIUS				WIDTH			O. D.	DEFLECTION		
		1	2	3	Avg	1	2	3		no load height	loaded height	% Def.
						11-13/32	11-13/32	11-13/32	42.68			
	52 52 54	9 1/8	9 1/8	9 1/8	9-1/8	11-15/32	11-15/32	11-15/32	42.80			
	52 50 52									9.844	8.156	17.1
		10-5/8	10-5/8	10-5/8	10-5/8	11-23/32	11-23/32	11-23/32	42.89			
	52 50 52	11-1/8	11-3/8	11-3/8	11.29	11-11/16	11-11/16	11-11/16	42.58			
	53 53 52	11-3/8	11-3/8	11-3/8	11-3/8	11-3/4	11-3/4	11-3/4	42.50			
	55 53 54	11-7/8	11-7/8	11-7/8	11-7/8	11-9/16	11-19/32	11-19/32	41.80			

bel cracks etc.

3.8

2

Assigned Tire No. 36Tire Size 11.00 20Initial Weight 217.20Inflation Pressure (cold) 45 p.s.i.Final Weight 198.50Loss 14.70

FRONT TIRE

Odom Miles	Actual Miles	Date				TREAD		DEPTH		POSITION				Avg Depth	HARD (6 3 Pols)
			1 Out	2 In	3 Out	4 In	5 Out	6 In	7 Out	8 In	9 Out	10 In			
	0	3-22													
	0	3-23	.610	.618	.617	.622	.620	.619	.618	.620	.612	.619	.618		52
	2417.4	4-6	.494	.502	.494	.498	.498	.498	.493	.500	.491	.501	.497		50
	3011.0	4-8	.462	.470	.466	.471	.468	.464	.460	.470	.458	.464	.465		
	3620.6	4-12	.454	.450	.452	.456	.456	.455	.445	.455	.444	.450	.452		
	4807.8	4-18	.414	.413	.420	.416	.416	.427	.415	.429	.418	.425	.419		50.5
	7046.9	4-28	.340	.381	.340	.355	.349	.352	.344	.359	.345	.355	.352		52.5
	7575.0	5-2	.305	.313	.301	.316	.308	.315	.299	.310	.307	.315	.309		
	8753.8	5-6	.278	.266	.276	.278	.276	.288	.273	.284	.285	.287	.279		
	9332.0	5-9	.258	.262	.254	.274	.272	.268	.250	.262	.256	.266	.262		54.5
	9798.8	5-11	.230	.230	.234	.238	.245	.246	.239	.246	.237	.250	.240		
	11195.5	5-17	.184	.180	.176	.193	.195	.202	.192	.210	.180	.202	.191		54.5
	11789.1	5-19	.184	.179	.172	.150	.173	.176	.175	.177	.165	.178	.173		
	12623.1	6-22	.148	.158	.144	.135	.148	.165	.148	.151	.143	.146	.149		55.5

REMARKS: - Note mileage, date and result of inspection for cuts, breaks, separation, wheel cracks

4-6 5-1/2" CUTS TO CORD - FUZZY APPEARANCE TO TREAD FROM ABRASION

4-18 3/4", 3/4", 1/2", 1/2", 1/2", 1/2, 1/2, 3/4", 1", 1/2", 1/2", 1", 1", 3/4" CUT

4-28 NUMEROUS 1/4 TO 1" CUTS TO CORD

5-9 MANY SMALL CUTS 1/4" TO 1"

5-17 SERIES OF CUTS - 1/4" TO 2" - VERY FUZZY

TRUCK WORN OUT AND REMOVED FROM TEST ON 5-23-60 - THIS TIRE HAD ACCUMULATED 12,628.1 MILES AT

1

Tire Serial No. GN 18757

Wheel No. _____

45 p.s.i.

vg epth	HARDNESS (4 3 Random Points)	CROWN RADII				WIDTH			O. D.	DEFLECTION		
		1	2	3	Avg	1	2	3		no load height	loaded height	% Def.
						11 1/2	11 1/2	11 1/2	42.5			
618	52 53 54	9-3/8	9-3/8	9-3/8	9.375	11-9/16	11-9/16	11-9/16	42.7	9.6875	8.250	14.8
497	50 50 51	10-1/8	10-1/8	10-1/8	10.125	11-25/32	11-25/32	11-25/32	42.84			
465												
452										9.688	8.406	13.2
419	50 52 52	9-7/8	10-1/8	9-7/8		11-25/32	11-25/32	11-25/32	42.70			
352	52 52 50	10-3/8	10-3/8	10-3/8	10-3/8	11-27/32	11-27/32	11-23/32	42.51			
309												
279												
262	54 54 54	10-7/8	10-7/8	10-5/8	10.79	11-3/4	11-3/4	11-3/4	42.22			
240												
91	54 55 55	10-7/8	10-7/8	10-7/8	10-7/8	11-25/32	11-25/32	11-25/32	42.25	9.469	8.125	14.2
73												
49	55 55 54	11-1/8	11-1/8	11-1/8	11-1/8	11-27/32	11-27/32	11-25/32	42.09			

wheel cracks etc.

3/4" CUTS TO CORN

18.1 MILES AND WAS WORN OUT

2

Tire Size 11.00 20

Inflation Pressure (cold) 45 p.s.i.

Final Weight _____

Loss _____

FRONT TIRE

[illegible]

REMARKS: - Note mileage, date and result of inspection for cuts, breaks, separation, wheel cracks

TIRE RUN 148.4 MILES ON DURABILITY TEST AND WAS THEN REMOVED TO RESERVE IT FOR SAND MOBILITY TEST

1

Wheel No. _____

45 p. 8. 1.

[illegible]

, wheel cracks etc.

LAND MOBILITY TESTS

2

Assigned Tire No. 38Tire Size 11.00 20Initial Weight 211.29Inflation Pressure (cold) 45 p.s.i.Final Weight 197.95Loss 13.34ECGIE TIRE

Odom Miles	Actual Miles	Date	TREAD			DEPTH		POSITION		8	9	10	Avg Depth	HA. 51 (4 3) Pair
			1 Out	2 In	3 Out	4 In	5 Out	6 In	7 Out					
	0	4-7	.625	.618	.618	.619	.618	.625	.617	.624	.625	.622	.621	52
	0	4-8												
	853.6	4-26	.494	.484	.489	.479	.490	.484	.495	.489	.504	.492	.490	
	1465.5	4-28	.484	.466	.472	.462	.475	.465	.487	.472	.490	.470	.474	54
	1993.6	5-2	.422	.400	.395	.375	.399	.393	.410	.396	.428	.403	.402	
	3172.4	5-6	.359	.323	.355	.335	.316	.344	.347	.336	.360	.325	.340	
	3750.6	5-9	.299	.280	.282	.256	.300	.300	.303	.274	.320	.280	.289	54
	4365.8	5-11	.249	.247	.240	.154	.228	.239	.240	.241	.270	.219	.233	
	5317.3	6-14	.179	.140	.153	.120	.161	.145	.177	.151	.194	.150	.157	54

REMARKS: - Note mileage, date and result of inspection for cuts, breaks, separation, wheel crack:

4-28 1" 1" 2" 1-1/2" 1" 3/4 3/4 2" 1 1 1-1/2 1-1/2 1 2 1 2" CHIP OUT OF LUG TO CORD

5-9 MANY CUTS - LUG CHIPPED TO BREAKER ABOUT 1-1/4" IN DIAMETER - NUMEROUS SMALL CHIPS OUT

REMOVED FROM TRUCK ON 5-15-60 - WORN AND CHUNKED OUT AFTER 5317.3 MILES - STILL HOLDS AIR OK. ONE

Tire Serial No. XA 45208

Wheel No. _____

p.s.i.

HARDNESS (# 3 Random Points)	CROWN RADIUS				WIDTH			O. D.	DEFLECTION		
	1	2	3	AVG	1	2	3		no load height	loaded height	% Def.
52 54 54	9-3/8	9-3/8	9-3/8	9.375	11-1/2	11-1/2	11-1/2	42.55			
					11-9/16	11-9/16	11-9/16	42.70			
54 53 54	9-5/8	9-7/8	9-7/8	9.79	11-25/32	11-25/32	11-25/32	42.85			
54 54 54	10-7/8	10-7/8	10-7/8	10-7/8	11-13/16	11-13/16	11-13/16	42.45			
54 53 52	10-7/8	10-7/8	10-7/8	10-7/8	11-27/32	11-27/32	11-27/32	42.16			

11 cracks etc.

TO CORO 1" 1/2" 1 1 1-1/2

OUT

OK. ONE AREA HAS 2" DIA. CHUNK OUT TO CORO

2

Assigned Tire No. 39 (NOT CONTROL TIRE)Tire Size 11.00-20Initial Weight 225.52 lbsInflation Pressure (cold) 45 p.s.i.Final Weight 216.08Loss 9.44

BOGIE TIRE

Odom Miles	Actual Miles	Date	TREAD		DEPTH		POSITION		8	9	10	Avg Depth	HARD (4 3 Fol	
			1 Out	2 In	3 Out	4 In	5 Out	6 In						7 Out
	0	4-25	.632	.645	.641	.634	.636	.646	.642	.630	.633	.632	.637	65
	611.9	4-28	.590	.582	.569	.576	.578	.578	.574	.582	.581	.580	.579	53
	1140.0	5-2	.540	.534	.539	.538	.537	.536	.537	.534	.539	.540	.537	
	2318.8	5-6	.480	.475	.490	.472	.489	.478	.474	.476	.470	.473	.478	
	2897.0	5-9	.448	.440	.440	.438	.446	.440	.448	.448	.440	.444	.443	59
	3512.2	5-11	.415	.403	.404	.408	.413	.420	.415	.404	.411	.405	.410	
	4908.9	5-17	.339	.334	.328	.326	.336	.334	.336	.333	.335	.349	.335	64
	5502.5	5-19	.320	.316	.337	.325	.336	.319	.328	.313	.338	.322	.326	
	6341.5	6-14	.280	.283	.281	.289	.265	.286	.271	.274	.280	.265	.277	60

REMARKS: - Note mileage, date and result of inspection for cuts, breaks, separation, wheel cracks

4-28 NO CUTS

5-9 NO CUTS

5-17 1/2", 1/2", 1/2" (SMALL CHIP OUT OF LUG) CUTS TO CORN

6-14 1", 1/2", 1/2", 1/2" CUTS TO CORN

TRUCK WAS WORN OUT AND TEST DISCONTINUED ON 5-23-60 - THIS TIRE STILL IN GOOD CONDITION

1

Tire Serial No. _____

Wheel No. _____

45 p.s.i.

g pth	HARDNESS (6 3 Random Points)	CROWN RADIUS				WIDTH			O. D.	DEFLECTION		
		1	2	3	Avg	1	2	3		no load height	loaded height	% Def.
17	65 67 65	9-1/8	9-1/8	9-1/8	9-1/8	11-19/32	11-19/32	11-19/32	42.75			
79	58 60 60	9-1/8	9-1/8	9-1/8	9-1/8	11-25/32	11-25/32	11-13/16	43.00			
37												
78												
13	59 61 60	9-7/8	9-7/8	9-7/8	9-7/8	11-13/16	11-13/16	11-13/16	42.70			
0												
35	64 62 64	10-1/8	10-1/8	10-1/8	10-1/8	11-7/8	11-7/8	11-7/8	42.48	9.5625	8.281	13.4
26												
77	60 61 62	10-3/8	10-3/8	10-3/8	10-3/8	11-7/8	11-7/8	11-7/8	42.30			

heel cracks etc.

2

Assigned Tire No. A (NOT CONTROL TIRE)

Tire Size 11.00 20

Initial Weight

Inflation Pressure (cold) 45 psi

Final Weight

Loss

BOGIE TIRE

Odom Miles	Actual Miles	Date	1		2		3		TREAD		DEPTH		POSITION		10	Avg Depth	HARD (43 psi)
			Out	In	Out	In	Out	In	4	5	6	7	8	9			
		5-6	.504	.486	.502	.489	.504	.490	.505	.492	.503	.494	.497				
	578.2*	5-9	.458	.458	.462	.455	.461	.455	.455	.458	.455	.462	.458				
	1193.4	5-11	.425	.429	.424	.428	.418	.420	.427	.422	.429	.423	.425				
	2590.1	5-17	.383	.373	.353	.358	.352	.355	.344	.338	.369	.347	.355				
	3183.7	5-19	.345	.339	.347	.342	.348	.336	.342	.327	.355	.322	.340				

REMARKS: - Note mileage, date and result of inspection for cuts, breaks, separation, wheel cracks

* MILEAGE SINCE MEASUREMENTS TAKEN ON 5-6 - THIS TIRE HAD BEEN IN SERVICE AND WAS NOT NEW WHEN TH

TIRE WAS NAIL PUNCTURED AND APPARENTLY RUN FLAT ON 5-21 AFTER 3746.6 MILES OF SERVICE

TIRES "A" AND NO. 39 WERE MANUFACTURED IN 1959 AND WERE NOT "CONTROL TIRES"

Winnel No. _____

3 p.s.i.

real crucks etc.

EW WHEN THE FIRST MEASUREMENTS WERE TAKEN ON 5-6

Unscheduled Tire Maintenance, 16-20 Tires

(Test started with Nos. 9 and 15 fronts, Nos. 8, 12, 14 and 17 on bogies)

<u>Truck No.</u>	<u>Tire No.</u>	<u>Maintenance or Changes</u>
12	17	<u>Failure</u> , cut in direction of travel on outside, and at 45° on inside near shoulder after 1186 miles of service on March 31.
12	6	Spare went on ground to replace failed No. 17 and was run for 39.5 miles during morning shift on March 31.
12	16	Put on ground in place of failed No. 17 at noon March 31 to start test.
12	6	Put back on spare rack at noon March 31.
12	14	Found to have nail in tire at noon March 31. Removed for repair.
12	13	Put on to replace No. 14 at noon March 31.
12	8	Punctured by hypodermic thermocouple. Removed for repair, noon April 1, after 1527 miles of service.
12	14	Repaired and put on in place of No. 8, noon April 1. (Tire missed 296.8 miles.)
12	8	Repaired and put on ground, noon April 4. (Tire missed 296.8 miles.)
12	13	Removed for future use when No. 8 was put back in service, noon April 4, after running 593.6 miles.
61	14	<u>Failure</u> , "x" break during morning shift April 7 after 2373 miles of service
61	6	Spare put on ground after failure of No. 14. Tire No. 6 ran 38.4 miles during morning shift April 7.
61	13	Put on spare rack at noon April 7.

<u>Truck No.</u>	<u>Tire No.</u>	<u>Maintenance or Changes</u>
61	6	Punctured during night shift April 7. Removed for repair after a total of 123 miles of service.
61	13	Spare put on ground to replace punctured No. 6. By noon April 8, this tire had 843.3 miles.
61	1	Put on spare rack at end of night shift April 7.
61	15	Removed at end of night shift April 13 because of slow leak after 4065.8 miles of service.
61	6	Put on R. F. at end of night shift April 13 to replace No. 15.
61	16	Had a slow leak at noon April 15. Removed for repair after 3280.8 miles of service.
61	18	Put on in place of No. 16, noon April 15.
61	12	<u>Failure</u> , after running 55 miles on night shift April 15 after 4566 miles of service. Tire had a stone cut running about 20° off of crosswise on tread and was damaged by having been run flat.
61	1	New spare started test when put on ground to replace failed No. 12 and was run 93.4 miles on night shift April 15.
61	7	Put on spare rack at end of night shift April 15.
61	6	Removed from L. F. and put on R. R. during rotation April 18.
61	15	Repaired and put back on L. F. during rotation April 18.
61	1	Put back on spare rack after 241 miles during rotation April 18.
61	7	Left in shop for future service - zero miles.
12	18	Removed this temporary tire from service at end of night shift April 18 after 445.2 miles of service.

<u>Truck No.</u>	<u>Tire No.</u>	<u>Maintenance or Changes</u>
12	16	Reinstalled after repairing leak at end of night shift April 18.
12	13	Removed for repair of slow leak at noon April 25.
12	18	Put on temporarily in place of No. 13 at noon April 25.
12	13	Repaired and reinstalled at noon April 26. (Missed 296.8 miles.)
12	18	Removed and left in shop for future use when No. 13 put back in service at noon April 26. (Tire now has 742 miles.)
12	8	<u>Failure</u> - Y-shaped rock break after running 44.3 miles on night shift April 26 after 6271 miles of service.
12	8	Spare put on ground when No. 8 failed and run 104.1 miles during night shift April 26. At noon April 27, this tire had a total of 494.3 miles.
12	18	Put on spare rack at end of night shift April 26.
34	13	Punctured after completing 101 miles on morning shift May 2, 1960.
34	18	Put on ground in place of No. 13 and run 47.4 miles during morning shift May 2. (789.4 miles at noon May 2.)
34	7	New spare put on spare rack at noon May 2. (0 miles).
34	15	<u>Failure</u> - L. F. went flat after completing 108.5 miles on morning shift May 4. Tire had a straight cut at 45° in tread after 7466 miles of service.
34	18	Flat at same time as No. 15 after total of 1344 miles of service May 4.

<u>Truck No.</u>	<u>Tire No.</u>	<u>Maintenance or Changes</u>
34	13	Tire had been repaired and brought out to driver to replace No. 15 to complete shift on morning of May 4.
34		Spare put on ground on R. R. in place of No. 18 to complete shift on morning of May 4.
34	7	Put back on spare rack during rotation at noon on May 4 after running 39.9 miles.
34	13	Removed from L. F. during rotation at noon May 4 and put on L. I. because No. 13 was a bogie tire.
34	10	New front tire started test at noon May 4.
34	1, 6, 13, 16	Bogie tires removed from vehicle at end of 36 psi test at noon May 6.
34	2, 3, 4, 11	New bogie tires started test at 30 psi, noon May 6.
34	3	<u>Failure</u> - Rock cut at 45° angle in tread after 185.6 miles of service on day shift, May 7.
34	7	Spare put on ground when No. 3 failed.
34	18	Had been repaired and was put on spare rack at noon May 7.
12	9	<u>Failure</u> - On R. F., removed from test after running 32.9 miles on night shift May 13 because tire leaked air through tread crack. Cracks had existed for some time and finally leaked. Cracks were in direction of travel. 10,575 total miles.
12	18	Spare put on ground to replace No. 9 and run 115.5 miles during night shift May 13. (1450.2 miles at end of shift.)
12	5	New spare put on spare rack at end of night shift, May 13.
12	11	Removed during rotation May 17 to repair nail puncture.

53

<u>Truck No.</u>	<u>Tire No.</u>	<u>Maintenance or Changes</u>
12	(extra) 1	Put on to replace No. 11 (tires 13, 16, 6 and 1 used in the 36 psi test had final measurements and were used as extra tires to finish 30 psi test.)
34	7	<u>Failure</u> - Straight stone cut in direction of travel after running 24.3 miles on night shift May 17. (2469 miles).
34	5	Spare put on ground when No. 7 failed and run 124.1 miles during night shift May 17.
34	(extra) 16	Put on spare rack at end of night shift May 17.
34	11	Repaired and put back on ground at noon May 18. (Tire missed 296.8 miles.)
34	(extra) 1	Left in shop as spare at noon May 18.
34	2 & 11	Tires partially flat before morning shift at 2:30 a.m. May 23.
34	(extra) 1 & 13	Substituted for 2 & 11 temporarily.
34	2 & 11	Put back in service at noon May 23. (Missed 135 miles.)
34	10	R. F. - Had a nail puncture noon May 24.
34	(extra) 13	Substituted for No. 10 noon May 24.
34	10	Repaired and reinstalled noon May 25. (Missed 296.8 miles.)
34	2	Removed during rotation for repair of nail puncture noon May 25. Extra tire substituted.
34	2	Reinstalled on R. R. at noon May 26.
34	2	Removed to repair nail puncture noon May 27. Extra No. 13 substituted.
34	2	Reinstalled at noon May 31.

<u>Truck No.</u>	<u>Tire No.</u>	<u>Maintenance or Changes</u>
34	4	Removed to repair nail puncture, noon May 31, extra No. 13 substituted.
34	4	Reinstalled at noon June 1.
34	2	Removed to repair another nail puncture, noon June 1.
34	2	Repaired and reinstalled at noon June 2.
34	2	Slow leak, removed to repair at noon June 5.
34	2	Repaired and reinstalled at noon June 7.
34	4	Punctured after running 40.4 miles on night shift June 7.
34	(extra) 16	Installed to replace No. 4, above.
34	2	Went flat after running 54.9 miles on night shift June 8. Extra tire substituted.
34	4	Repaired and reinstalled at noon June 9.
34	11	<u>Failure</u> - Stone cut at 45° angle in tread after running 107.7 miles on morning shift June 10. (8344 total miles.)
34	2	Put back in service at noon June 13.

Mechanical failures of truck exhausted spare parts. Test terminated after completing night shift June 13, 1960.

Unscheduled Tire Maintenance, 11.00-20 Tires

(Test started with Nos. 34 and 36 fronts, Nos. 30, 31, 32 and 33 bogies)

61	32	Punctured during night shift March 30.
61	35	Spare put on ground in place of 32. Ran 79 miles on this shift.
61	32	Repaired and reinstalled, noon March 31. (Misc. 227.4 miles.)

<u>Truck No.</u>	<u>Tire No.</u>	<u>Maintenance or Changes</u>
61	35	Put back on spare rack at noon March 31. (Ran 227.4 miles.)
12	30	<u>Failure</u> - Unknown cause, damaged by having been run flat on night shift April 6; 2447 total miles.
12	35	Put on ground to replace No. 30 during night shift April 6 and run 120.3 miles. At noon April 7, this tire had 496.1 miles.
12	37	Put on spare rack on April 7.
61	31	<u>Finished Test</u> - Chunked out rubber to cords and worn out. Still held air at noon April 21. 5730 total miles.
61	38	New tire installed on ground to replace No. 31, noon April 21.
(Truck No. 34 substituted for No. 61 on night of April 21. Mechanical trouble.)		
34	36	Slow leak at noon April 26. Removed for repair.
34	37	Put on in place of No. 36 during rotation, noon April 26.
34	32	<u>Finished Test</u> - Worn out; removed noon April 26 after 6356 total miles.
34	39	New non-control tire installed on ground in place of No. 32 at noon April 26.
34		Non-control tire put on spare rack, noon April 26.
34	37	Removed from test after 148.4 miles to reserve tire for mobility tests at end of night shift April 26.
34	36	Repaired and reinstalled at end of night shift April 26 on L. F. (Missed 148.4 miles.) Tires now: 34 & 36 fronts, 33, 35, 38, 39 bogies, non-control spare.

<u>Truck No.</u>	<u>Tire No.</u>	<u>Maintenance or Changes</u>
12	33	<u>Failure</u> - Stone cut in side wall near shoulder after running 33.4 miles on night shift April 28. 7229 total miles. A non-control spare tire replaced No. 33.
34	36	Removed from L. F. for repair of puncture at noon May 9. Non-control tire replacement used temporarily.
34	36	Repaired and reinstalled at end of night shift May 9. Tire missed 148.4 miles.
34	35	<u>Finished Test</u> - Removed during rotation at noon May 13. Worn out - still held air - 8384 total miles. Non-control tire substituted.
34	38	<u>Finished Test</u> - Removed at noon May 15. Worn and chunked out, still held air. 5317 total miles.
12	34	<u>Finished Test</u> - Removed from test at noon May 19. Worn out - still held air. 12,086 miles.
12	A	(Non-control tire.) Apparently run flat. Removed from vehicle during day shift May 21. 3747 total miles.
12	36	<u>Finished Test</u> - Removed from test. Worn out after total of 12,628 miles at noon May 23.

Test Terminated - Test tires exhausted, noon May 23.

E. Phase 5 - Mud Mobility

1. Preparation of Vehicles and Equipment

Mud mobility tests were conducted with two M35, 2-1/2 ton 6 x 6 Ree trucks. Unit number 21160972 was equipped with (new) single 16-20 tires and the other truck, number 4A9206, with (new) single 11.00-20 tires, which are standard on the M34 Ree.

These trucks were ballasted with rocks, nominally 3 inches in diameter, to obtain loadings on the intermediate and rear axles comparable to those on the M135 trucks used in the durability tests. The actual GVW and wheel weights, which were determined in the same manner as on the M135's, were as follows:

	<u>Truck No. 06</u>	<u>Truck No. 72</u>
Left Front	2740 lb.	2750 lb.
Right Front	2740	2780
Left Intermediate	3710	3710
Right Intermediate	3720	3740
Left Rear	3760	3750
Right Rear	3795	3735
GVW (State Certified)	20,680	20,680

Gross vehicle weights were determined by weighing the whole vehicle at once on a state certified scale and the wheel weights were determined on two scales set flush with a concrete floor in a permanent installation. The difference between the total of the wheel weights and the GVW, which amounts to an error of about 1%, was probably caused by hysteresis in the vehicles' suspension system or possibly a small difference between the calibration of the scales.

These trucks were fitted with electric tachometers and were serviced and tuned up in the same manner as the durability test trucks.

While the vehicles were being prepared for test, several other items of equipment were constructed. An aircraft hydraulic cylinder, nominally 2 feet long and 4-1/4 inches in outside diameter, was fitted with a 0-1500 psi Ashcroft bourdon-tube pressure gage which had 10 psi subdivisions for use in measuring drawbar effort. The cylinder was then calibrated, and a linear relationship established between drawbar load (up to 16,250 pounds) and gage pressure reading, on a Baldwin Tate-Emery Universal Testing Machine. An electric Roots counter

was connected through a short cable to the speedometer drive gear in the transfer case to determine average bogie wheel revolutions in traversing a measured distance. This equipment, together with its 110 volt A.C. inverter, could be quickly transferred from one truck to the other.

Cone penetrometer measurements were scheduled to obtain an index of the shear strength of the mud. Three 30° cone tips were available with projected areas of 1/2, 1 and 2 sq. in. to cover the range of anticipated soil conditions. Deflection of the proving ring at the top of the penetrometer is indicated on a dial indicator which has an arbitrary scale to indicate the force required to push the penetrometer into the soil. This dial was calibrated on a platform scale to establish the linear relationship between the dial reading and the downward force. Shear strength measurements were also scheduled through the use of a grouser plate supplied by Detroit Arsenal. This unit consisted of two parallel aluminum plates, each approximately 7-1/2 inches long and 2 inches wide which had 25 evenly spaced fins projecting downward from the bottom of the plates. Measurement was to be made with a spring scale of the effort required for horizontal displacement against the restraining effect of the fins projecting into the mud with various vertical dead loads.

A mud course was prepared by removing the vegetation and leveling an area in a field. A portion of this natural hardpan surface, nominally 30 feet wide and 100 feet long, was then topped with a 1 to 2 inch layer of brown farm soil which was free of stones or rocks. Tests were conducted on this slick mud surface and later in a 12-inch depth of mud.

2. Operating Procedure

After several days of trial runs in this area, a practical procedure was developed and was followed daily to compare the tractive effort of the 16-20 and 11.00-20 tires at various inflation pressures.

Before tests could be run in the morning, the farm soil was smoothed out with a road grader to eradicate the ruts from previous tests. Water from a nearby reservoir was then sprayed on the area with a pump. The desired degree of muddiness could best be judged by observation or in walking in the area. Since the depth of mud was only about 2 inches, the cone penetrometer went through to the hardpan before a series of readings could be obtained. The grouser plates did not give very consistent information; if more weights were stacked on top of the plates, a greater force was required to move it horizontally, but a plot of the

weight versus the towing force required gave scattered points through which no smooth curve could be drawn.

After preparing the area, the first test M35 truck was parked on the approach to the mud pit with a 2-1/2 ton M135 truck, which provided the towed load, connected with a 100 foot cable behind it. Interposed in the tow cable, immediately in front of the M135 truck, was the hydraulic cylinder used to measure the drawbar load. The long cable enabled the M135 to operate on the dry approach to the pit where no wheel slippage would occur and the amount of towed load could be controlled through throttle opening. The engines of both trucks were then started and the drive trains were operated in first-low. The M35 was driven at governed engine rpm into the pit and the driver of the towed truck opened his throttle only enough to maintain slow forward motion. When the two vehicles became coordinated, one man walking beside the M35 placed a marker stick in the mud at the center of one of the bogie wheels and simultaneously signalled an observer in the truck to turn on his counter. After traveling about 35 feet, a second stick was placed in the mud and the observer noted the reading on the counter. After a total of about 70 feet, a third stick was placed in the mud at the center of the same wheel and the counter was switched off. During the progress through the course, an observer noted the readings of drawbar load. This load, the wheel revolution count, and the distance, measured with a steel tape between each of the stakes, were recorded. The trucks were then disconnected, the M135 backed to its original position and the other M35 was connected for a trial. The trucks were run alternately with each run in undisturbed mud, beside the previous run or astraddle of one set of the previous tracks. After completing the required trials, the course was allowed to dry in the hot afternoon sun so that it would be ready to grade the next morning.

Numerous repetitious trials were conducted with the 16-20 tires inflated to 12, 20, 28 and 36 psi and the 11.00-20 tires inflated to 15, 25, 35 and 45 psi. Data tabulated at the end of this section indicates that in the shallow mud depth, there was negligible change in the tractive effort with changes in inflation pressures. In comparing the two tire sizes, the 11.00-20's frequently appeared to have an advantage, but the margin of difference was small. The data presented excludes the first few days' work because of various troubles experienced. Some of these will be enumerated because they might be helpful in future work:

1. The sprag units in the front of the transfer case, which automatically engage the front wheels when the bogies turn 8% faster than the front wheels, sometimes fail to engage or

abruptly disengage while the test is in progress. This is quite noticeable to an observer beside the truck, and the drawbar load drops off sharply so that when this happens, the test is voided.

2. The towed truck must be aligned directly behind the test truck to avoid going off course and reducing drawbar load.
3. Space must be left in filling the hydraulic cylinder to allow for thermal expansion of the fluid and a small snubber should be included in the gauge line to smooth out pulsations developed in the traction effort. The snubber must be sized carefully to avoid too slow a reaction time.

After completing the first low mud test, the pit was filled to a depth of 12 to 14 inches with the same brown farm soil. The area was smoothed with a grader and watered down for two days. With the tires on each truck inflated to their highest specified pressure, some experimental runs were made through the mud. The trucks were barely able to negotiate this mud, which was quite soft and sticky, so drawbar measurements were considered impractical. The mud required about four days to dry out and was then smoothed out with a disc harrow and a road grader. It was decided during the second trials that the trucks would be timed to measure the interval required to travel 90 feet in the mud. Unfortunately, the soil had apparently become compacted in preparing the area and both trucks traveled the length of the pit with ease.

After the mud had dried out again, a small crawler tractor (which exerted low ground pressure) with a 5-tooth ripper, was used to loosen the soil to a depth of 12 to 14 inches. The lumps were broken with a disc harrow and the area was again watered down over a two-day period. This was quite effective and produced a very soft, rather sticky mud which tended to slough back into the wheel tracks (like wet concrete immediately after it is poured). With the 2 inch cone, the penetrometer registered an average of about 45 at a depth of 1 foot, which corresponds to a downward force of only 27 pounds. The trucks were operated in first-low at governed engine rpm and entered the pit at approximately 4 mph. With the 16-20 tires inflated to 36 psi and the 11.00-20 tires to 45 psi, both trucks became stuck in the mud before traveling half the length of the pit. The trucks were pulled free and inflation pressures of all tires were lowered to 12 psi. The truck with the 16-20 tires was then able to travel the entire length of the pit, and the truck with 11.00-20 tires became immobilized after 42 feet. The unit with 11.00-20 tires was given another trial but slipped into the original ruts. At the end of these runs, the truck stuck again. The unit with 16-20 tires

was given another trial and would have traveled the length of the pit a second time except that after approximately 80 feet, the front wheels disengaged, causing the truck to become immobilized. At the direction of Detroit Arsenal, the mud tests were then terminated.

3. Data - Mud Mobility - Phase 5

Rolling Circumferences - Measured on pavement at 2 mph with vehicles loaded to 20,680 pounds GVW.

	<u>Inflation Pressure psi</u>	<u>Distance Traveled in 10 Wheel Revs.</u>	<u>Feet Per Revolution</u>
<u>16-20 Tires</u>			
	12	101'-8"	10.17
	20	105'-1"	10.51
	28	107'-10"	10.78
	36	109'-6"	10.95
<u>11.00-20 Tires</u>			
	15	99'-4"	9.93
	25	102'-8"	10.27
	35	105'-2"	10.52
	45	106'-5"	10.64

Wheel Revolution Counter - Was driven by the speedometer cable which had an overall ratio of 1.88 counts for each rear wheel revolution (the speedometer adapters were for trucks with 9.00-20 tires) or stated another way, each count equalled .532 wheel revolutions.

Example of Wheel Slip Calculation - (See Run 1, August 1, 1960 for base figures.)

16-20 tire circumference at 20 psi = 10.51 feet
 Total wheel revolutions = 17
 Distance traveled if no slip occurred = $17 \times 10.51 = 178.67$ feet
 Measured total distance traveled = 64.67 feet

178.67 Total possible distance
 -64.67 Actual distance
 114.00 Feet slipped

$114.00 / 178.67 = 63.8\%$ Slippage

Data from Mobility Tests in 1 to 2 Inches of Mud

August 1, 1960

Penetrometer Measurements, 1 sq. in. Cone

Dial Reading	Actual Downward Force, lb.	Depth, Inches
120	65	0
260	135	1

(Top, large end, of cone flush with top of mud surface)
(Top of cone 1 inch below top surface of mud)

Grouser Plate Measurements

Vertical Load, lb.	Horizontal Force Req'd to Move Plates, lb.
24	15
39-1/3	22
57-1/3	32

Vehicle Tests

Test No.	Tire Size	Inflation Pressure psi	Drawbar Pull, lb.	Distance to 2nd Stake	Wheel Revs.	Distance to 3rd Stake	Total Wheel Revolutions	Avg. Percent Wheel Slip
1	16-20	20	1700	31'-6"	7.5	64'-8"	17.0	63.8
2	11.00-20	25	2560	35'-5"	8.5	70'-11"	16.0	56.8
3	11.00-20	25	2560	34'-10"	7.5	69'-5"	14.4	53.1
4	16-20	20	2210	36'-11"	6.9	73'-9"	14.9	52.9

Data from Mobility Tests in 1 to 2 Inches of Mud

August 3, 1960

Penetrometer Measurements, 1 sq. in. Cone

Dial Reading	Actual Downward Force, lb.	Depth, Inches
200	104.5	0
300	155	1
100	55	0
240	124.5	1

Grouser Plate Measurements

Vertical Load, lb.	Horizontal Force Req'd to Move Plates, lb.
24	15
39-1/3	22
57-1/3	32

Vehicle Tests

Test No.	Tire Size	Inflation Pressure psi	Drawbar Pull, lb.	Distance to 2nd Stake	Wheel Revs.	Distance to 3rd Stake	Total Wheel Revolutions	Avg. Percent Wheel Slip
1	16-20	36	2350	30'-11"	8.5	63'-4"	17.6	67.1
2	11.00-20	45	2800	33'-2"	11.2	66'-10"	21.8	71.2
3	11.00-20	45	2900	33'-2"	8.5	67'-7"	16.5	61.5
4	16-20	36	2210	33'-10"	11.2	67'-9"	22.3	72.3

Data from Mobility Tests in 1 to 2 Inches of Mud

August 4, 1960

Penetrometer Measurements, 1 sq. in. Cone

<u>Dial Reading</u>	<u>Actual Downward Force, lb.</u>	<u>Depth, Inches</u>
125	67	0
300	155	1

Grouser Plate Measurements

<u>Vertical Load, lb.</u>	<u>Horizontal Force Req'd to Move Plates, lb.</u>
24	16
39-1/3	23
57-1/3	34

Vehicle Tests

<u>Test No.</u>	<u>Tire Size</u>	<u>Inflation Pressure psi</u>	<u>Drawbar Pull, lb.</u>	<u>Distance to 2nd Stake</u>	<u>Wheel Revs.</u>	<u>Distance to 3rd Stake</u>	<u>Total Wheel Revolutions</u>	<u>Avg. Percent Wheel Slip</u>
1	16-20	12	2800	31'-5"	7.5	61'-3"	13.8	56.4
2	11.00-20	15	4150	35'-6"	6.9	78'-5"	13.3	40.6
3	11.00-20	15	2800	31'-6"	10.1	63'-3"	18.1	64.8
4	16-20	12	2500-2800	34'-4"	9.0	66'-1"	16.5	60.6

Data from Mobility Tests in 1 to 2 Inches of Mud

August 5, 1960

Penetrometer Measurements, 1 sq. in. Cone

Dial Reading	Actual Downward Force, lb.	Depth, Inches
150	79.7	0
300	155	1

Grouser Plate Measurements

Vertical Load, lb.	Horizontal Force Req'd to Move Plates, lb.
24	13
39-1/3	27
57-1/3	42

Vehicle Tests

Test No.	Tire Size	Inflation Pressure, psi	Drawbar Pull, lb.	Distance to 2nd Stake	Wheel Revs.	Distance to 3rd Stake	Total Wheel Revolutions	Avg. Percent Wheel Slip
1	16-20	28	2800	29'-1"	9.0	58'-6"	19.2	71.7
2	11.00-20	35	3300	30'-10"	9.0	60'-9"	18.6	69.0
3	11.00-20	35	2800	31'-4"	7.5	62'-2"	13.8	57.2
4	16-20	28	2800	29'-4"	12.2	59'-3"	26.6*	---

*Front wheel sprag unit disengaged during this test. Bogies spun and drawbar load dropped to 1150 lb.

Data from Mobility Tests in 1 to 2 Inches of Mud

August 8, 1960

Penetrometer Measurements, 1 sq. in. Cone

Dial Reading	Actual Downward Force, lb.	Depth, Inches
60	35	0
28.	145	1

Grouser Plate Measurements

Vertical Load, lb.	Horizontal Force Req'd to Move Plates, lb.
24	12
39-1/3	23
57-1/3	38

Vehicle Tests

Test No.	Tire Size	Inflation Pressure psi	Drawbar Pull, lb.	Distance to 2nd Stake	Wheel Revs.	Distance to 3rd Stake	Total Wheel Revolutions	Avg. Percent Wheel Slip
1	16-20	12	2210	28'-9"	7.5	57'-10"	15	64.5
2	11.00-20	15	2680	31'-5"	8.5	61'-2"	9.6	66.9
3	11.00-20	15	2800	30'-8"	10.1	62'-3"	2.3	71.9
4	16-20	12	2550-2800	30'-9"	10.1	61'-7"	16.0	62.2

Data from Mobility Tests in 12 Inches of Mud

August 12, 1960

Several experimental trials conducted with each truck - Both trucks were barely able to travel through the length of the mud pit. 16-20 tires at 36 psi, 11.00-20 tires at 45 psi.

August 19, 1960

Same inflation pressures as on August 12.

Penetrometer Measurements, 2 sq. in. Cone

Dial Reading	Actual Downward Force, lb.	Depth, Inches
25	17	0
115	62	2
160	84.5	4
50	30	0
160	84.5	2
200	104.5	4
240	124.5	6
60	35	0
240	124.5	2
300	155	4

Time to Traverse 90' in Mud

11.00-20 Tires	20 Sec.
16-20 Tires	21 Sec.
16-20 Tires	27.5 Sec.
11.00-20 Tires	Stuck after 26 Sec.

Data from Mobility Tests in 12 Inches of Mud

August 26, 1960

Mud was extremely soft, wet and sticky and tended to slough back into the vehicle tracks similar to the way wet concrete flows when it is first poured. With the 3 sq. in. cone penetrometer, measurements registered from 35 to 70 (21.5 to 40 lb. downward force) and averaged about 45 (27.5 lb.) at a depth of 1 foot.

Vehicle Tests

Trial No.	Tire Size	Inflation Pressure		Performance
		psi		
1	16-20	36		31' to stall
2	11.00-20	45		46'-6" to stall
3	11.00-20	45		37'-10" to stall
4	16-20	12		Ran complete length of pit
5	11.00-20	12		42' to stall
6	11.00-20	12		47' to stall
7	16-20	12		Truck ran 80' in mud and would have completed length of pit but front wheels disengaged, causing stall.

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